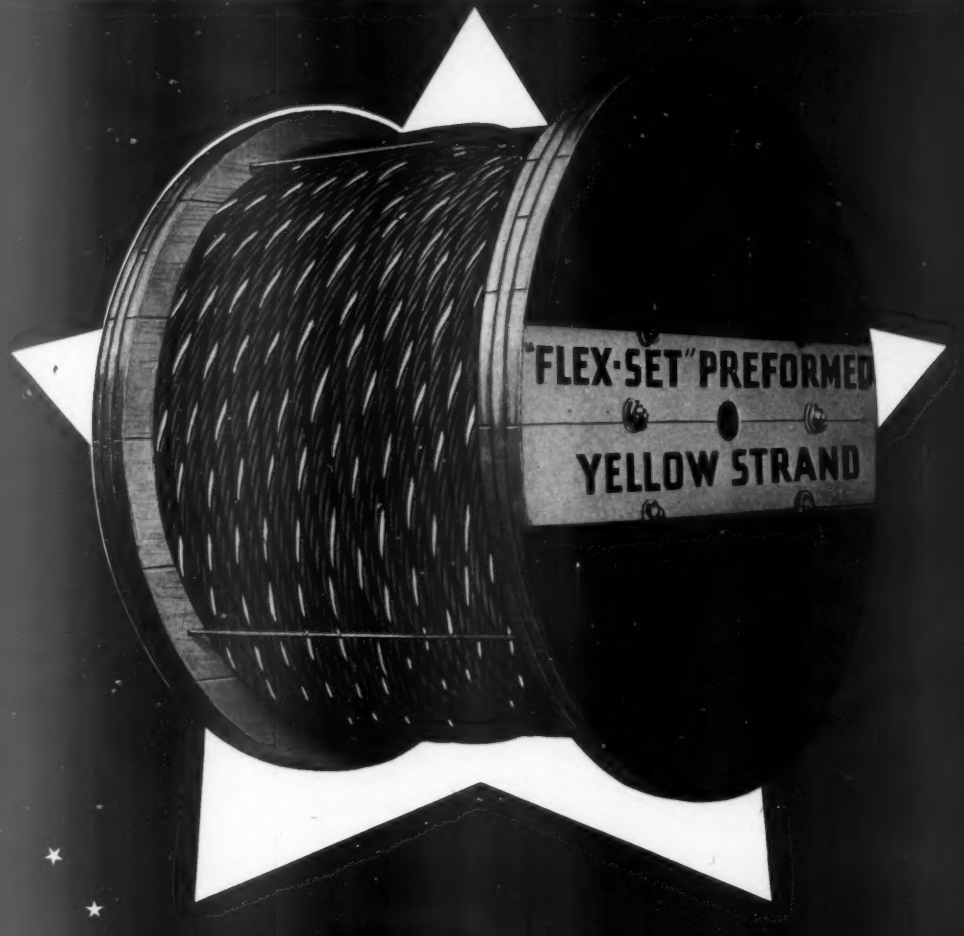
MAR 1 2 1943

The OIL AND GAS JOURNAL



YELLOW STRAND

MARCH 11, 1943

EMCO PRESSED STEEL METERS

Accurate measurement by EMCO Pressed Steel Meters, positive line control with Nordstrom Valves on this large volume industrial meter setting

THE BEST METER IN THE END BECAUSE, IT'S MORE METER TO BEGIN WITH!

FROM the hundreds of gas utilities, who for years have been relying upon EMCO Pressed Steel Meters for accurate, dependable measurement, have been received many expressions concerning their reliability and satisfactory operation. We quote the following paragraphs from a recent statement made by a well known superintendent of gas distribution and regulation in New York state.

"Taking into consideration all of the variables of metering service, we have had very fine success with our EMCO No. 4½ and No. 5 Meters. Tests, following reconditioning, usually show perfect results.

"It is very interesting to note the small error in EMCO Pressed Steel Meters after passing large volumes of gas. For example, two of these meters passed 180 million cubic feet, each at 10 pounds pressure under severe turn-on and turn-off conditions. One of these meters was found to be ½% slow and another ½% fast.

"An approximate estimate of the volume passed per EMCO Pressed Steel Meter in our system would be about 2 million cubic feet per month, per meter. Our repair costs and service costs for our large capacity meters are exceedingly small in comparison to the large quantity of gas metered."

Expressions such as these prove that the EMCO Pressed Steel Meter is the best meter in the end because it's more meter to begin with.

To Aid in Keeping 'Em Measuring

Write for this Manual

THIS 80-page manual, profusely illustrated, tells the approved methods for renewing the life of all EMCO and Ironclad Meters. Factory designed jigs and tools described therein can be secured that will simplify repair procedure and assure an accurately fitted job even with inexperienced labor.

Meter Shop Foremen, Distribution Superintendents and Measurement Engineers are invited to write for this Repair and Maintenance Manual as well as for up-to-date parts lists for all EMCO products.

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Table of Contents

NEWS DEVELOPMENTS

Ickes Asks for Steel for Products-Line Extension 22
A Survey of Crude Pooling 23
District 2 Companies Join Crude-Pooling Plan 24
Plan Temporarily Shelved in Rockies 24
McCollum Takes High Position With Jersey Company 26
PIWC's Postwar Planning Organization Set Up 27
Air-Cargo Carriers Here to Stay 30
OWI Gives Insight on Oil Consumed by Warfare 32
Crude Demand Rises 8 Per Cent, B of M Concludes 34
Hold Gravity Price Ceilings No Stimulant to Fuel Supply ... 35
New Catalyst Yields More and Improved Products 38

Trends 21
This Week 25
State Capitals 28
Editorial 29
Federal Order Digest 33
Deaths 38
Natural-Gas News 74
Natural-Gasoline News .. 74
Refining News 75
Pipe-Line News 78

ENGINEERING—OPERATING

More Efficient Burning of Refinery Fuels 39
Correct Setting May Prevent Surface-Pipe Troubles 43
Improved Practices at Compressor Station 44
Steam Consumption of Reciprocal Pumps 48
Troubles Impede Drilling in Embar Field 57

Plant Practices 54
Operating Ideas 60
Questions on Technology. 62
Cost Engineering 67
Eng. Fundamentals 69
Journalog 71

EXPLORATION AND DRILLING

Week's Highlights 81
Completions in All Fields 81
Geologic Background of Illinois Basin 82
Daily Average Production for Week 82

ADDITIONAL FEATURES

Drilling Contractors 102
Personals 104
Market Developments ... 106
Refinery Prices 107
Equipment Progress 108
Classified Advertising ... 109
Calendar of Events 112
Advertisers' Index 112

General Heading: BAKER ROTARY WALL SCRAPER and BAKER ROTARY WALL SAMPLER

BAKER OIL TOOLS, INC.
Main Office and Factory:
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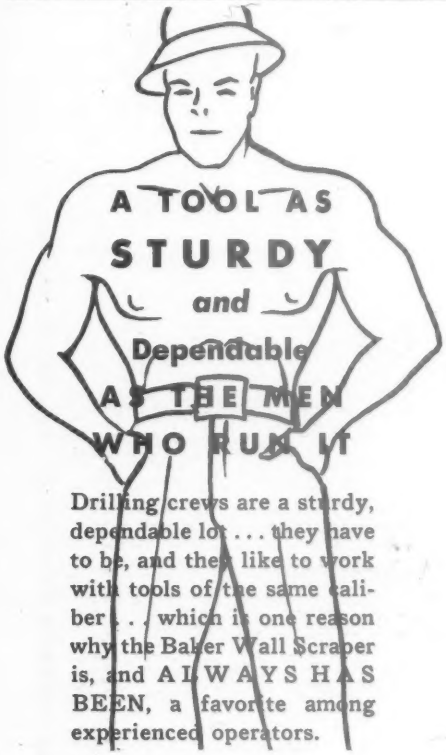
Export Sales Office:
19 Rector Street, New York, N. Y.

Unit No. A-22

Subject:

A Simple Solution to Hole Enlarging and Wall Scraping Problems

Index 250.1
Date: March 11, 1943
Page: 1 of 1 pg.



Drilling crews are a sturdy, dependable lot . . . they have to be, and they like to work with tools of the same caliber . . . which is one reason why the Baker Wall Scraper is, and ALWAYS HAS BEEN, a favorite among experienced operators.

Service Note

Competent Baker men will service, make suggestions, and otherwise assist in securing best possible results.

The Baker Rotary Wall Scraper provides a safe, economical method of enlarging the walls of an open hole to a diameter considerably larger than that of the casing through which it is run.

SIMPLICITY OF USE AND OPERATION:

This tool is practically fool-proof. It is constructed with a minimum number of essential parts. Any experienced driller can secure FIRST TIME satisfactory results.

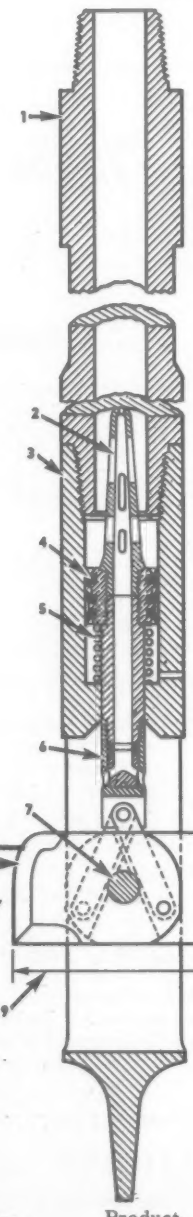
GREAT STRENGTH AND REAMING CAPACITY:

Correct design plus sturdy construction, have combined to give the tool great strength (safety), and a remarkable reaming capacity. This has resulted in the Baker Wall Scraper being able to accomplish many jobs never before considered possible.

TWO TOOLS IN ONE:

Also, don't overlook the fact that the Baker Wall Scraper is really "Two Tools In One," as by merely substituting Sampler Blades for the regular Scraper Blades the tool is converted into a Baker Wall Sampler. With this device it is possible to take cores from the side walls of any uncased hole at any depth . . . cores that are adequate for accurate laboratory analysis.

Send for Baker Broadcast No. 19 . . . a 40-page illustrated treatise giving complete details as to the many practical field applications for the Baker Wall Scraper and Wall Sampler.



Product No. 500

Baker Rotary Wall Scraper

Features Which Make the *BAKER ROTARY WALL SCRAPER* A DEPENDABLE TOOL:

(1) Double Pin Drill Collar — Connects Wall Scraper Body to drill collar.

(2) Circulation Screen — Design of cone-shaped Screen minimizes abrasive action of fluid and prevents debris from clogging circulation passages.

(3) Wall Scraper Body — Machined out of a solid piece of special alloy steel . . . provides great strength.

(4) Plunger Head — Provided with oil resistant Seals to prevent fluid by-pass and insure Piston efficiency . . . Blades will Positively Open.

(5) Plunger Spring—Strong Plunger Spring insures proper closing of blades.

(6) Bushing (Circulation Bean)—Fluid is directed on each blade, lubricating and cooling cutting surfaces.

(7) Hinge Pin—Machined from solid piece of special alloy steel.

(8) Blades—Machined from special alloy steel forgings . . . afford toughness and hardness. Cutting edges are hardfaced and set with Tungsten Carbide Inserts. Long bearing surface on blades minimizes "corkscrewing."

(9) Blade Expansion—Amazing reaming capacity provided by expansion range of Cutter Blades from 4" to 36".

For further instructions and operating details, see pages 279-287 of the 1942 Baker or Composite Catalog.

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States — Page 82

CRUDE PRODUCTION 3,906,730 bbl. daily average—up 46,655 bbl. One year ago 3,960,200 bbl.

CRUDE STOCKS 235,217,000 bbl. as of Feb. 27 — up 655,000 bbl. One year ago 259,373,000 bbl.

GASOLINE STOCKS 93,157,000 bbl. as of Feb. 27—up 942,000 bbl. One year ago 108,156,000 bbl.

RESIDUAL FUEL-OIL STOCKS 70,140,000 bbl. as of Feb. 27—down 288,000 bbl. One year ago 87,319,000.

GAS OIL AND DISTILLATES 32,939,000 bbl. as of Feb. 27—down 428,000 bbl. One year ago 34,058,000.

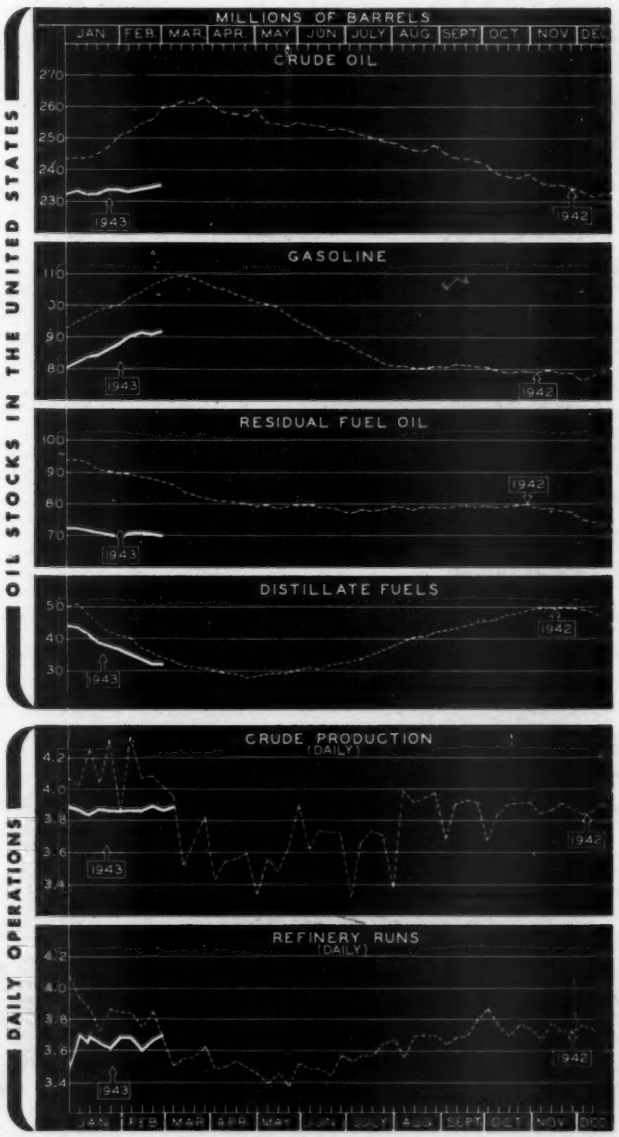
REFINERY RUNS 3,709,000 bbl. daily week ended Feb. 27—up 15,000 bbl. One year ago 3,672,000 bbl.

Refinery report delayed.

SEVERAL representative leaders of the petroleum industry are in agreement that a "showdown" relative to future prices for crude oil and products is a matter of days. Others who are familiar with the facts on which this prediction is made contend that similar conditions have prevailed in the recent past and all that has resulted is further postponement in final decisions. Probably at no time in the history of the petroleum industry has there been more confusion than has prevailed in recent weeks in regard to crude-oil prices. Congressmen, senators, representatives of state regulatory bodies, and small and large operators after visiting Washington, have returned to the oil country confident that the requests for generally higher crude-oil price schedules would be granted promptly.

IT IS now contended that all the efforts to secure the higher prices are to come to a head and the industry will then know what the pricing policy of the Government is to be over the next few months at least. "The buckpassing," according to one operator, "will at least end and we will know where we stand." It is said that the PAW chief officials favor the higher price schedules and are ready to insist on action on the part of OPA. It is pointed out that PAW is interested in securing an immediate decision because of the relationship that future returns to operators have to the program the petroleum agency has outlined for the remainder of this year and later. It is contended that if oil producers are not to have the additional revenue to carry on their operations, then some other method of compensation will have to be worked out. This is particularly important in relation to the plan to drill 4,500 or more wildcat wells this year.

WHILE the proposed crude-oil price advances stand on their own feet these upward adjustments naturally are tied in with other pricing matters, some of which have also been pending for months. It is assumed that any advances in crude price schedules will be compensated for through changes in price ceilings for refinery products. The matter of wider margins for jobbers and dealers in petroleum products to compensate for increased operating costs and reduced gallonage in some cases is also a phase of this situation. All of these market matters have been covered in studies of PIWC and their findings either directly or through PAW have been presented to the Government, including OPA and other war agencies.



Ickes Asks for Steel to Extend Products Line to East Coast

by Henry D. Ralph

WASHINGTON, D. C.—The "battle of the little big inch" has been ended by Petroleum Administrator Harold L. Ickes through a decision to construct the western end first, as originally planned, but he has asked War Production Board for immediate authorization to continue the 20-in. products line on to the Atlantic seaboard.

This decision was announced last week to the Truman committee of the Senate which had earlier opened an investigation into the merits of the contention advanced by Mid-Continent refiners that the eastern end of the line should be built first.

Administrator Ickes submitted to the Truman committee a comprehensive report prepared by the PAW Transportation Division analyzing the substitute proposal and concluding that the original project would require less steel, could be completed sooner, would deliver more oil, and would result in better operating conditions.

The opposition from PAW District 2 refiners was based in large part on the fear that the line might never be completed beyond Indiana, thus giving Texas refiners a postwar access to the Midwest market, but they declared that they would have little objection to construction of the western end first if they were assured that the line would be built all the way East at once.

Decision Hastened by War

Immediately after announcing his decision to proceed with the original construction schedule, Administrator Ickes wrote WPB asking for an allocation of steel for the eastern part of the line. He had intended to make a study in May as to probable need for this extension, but he wrote WPB:

"In the light of current developments, particularly in the military sphere, and the future prospects so far as any of us can anticipate the future, it is my judgment that the 20-in. petroleum products pipe line from Texas, the first installment of which to Norris City, Ill., and Seymour, Ind., has already received the approval of the War Production Board, must be completed through to the eastern seaboard. We cannot await actual need, a need which as applied to petroleum may well be of the most critical character in the prosecution of the war on actual battlefronts."

Contracts have already been let for pipe required for the 836-mile section of the line from the Houston-Beaumont area to Seymour, Ind., and negotiations for motors, pumps, valves, transformers and supplemental equipment and materials are well advanced. Actual construction work is scheduled to start by the end of this month, and the western end is scheduled for completion by September 1. The line will have a capacity of 235,000 bbl. of gasoline per day, and the gasoline will be shipped eastward by tank car from Norris City and Seymour.

The report submitted to the Truman committee pointed out that a 20-in. pipe line from Texas to Illinois was one of the several projects suggested at a conference of pipe-line executives and engineers in Tulsa March 23, 1942, and this project has been discussed by the industry frequently since then, but it was not until February 1, 1943, that District 2 spokesmen first suggested building the line in the East. On February 15 Frank Phillips, chairman of the PAW general committee for District 2, submitted a formal proposal to construct the line from St. Louis, Mo., to the New York Harbor area, with a 10-in. extension to Providence, R. I., and Boston, Mass. Later the New England extension was withdrawn from the District 2 plan.

The report of the PAW Transportation Division submitted to the Truman committee concluded:

1. The District 2 proposal as originally submitted would require 22,000 tons more new steel, 44 per cent more motors and pumps, and 12,000 more horsepower than the PAW project, and would deliver approximately the same quantities of products to the East Coast.

2. The PAW project would require 6,000 tons less critical materials, 15 per cent less power, 18 per cent less pumps and motors, and substantially less critical fittings and equipment than the revised District 2 proposal with the elimination of the New England extension.

3. The PAW project will deliver 9,000 to 12,000 bbl. per day more oil to the East Coast than would be pos-

(Continued on Page 33)

Pipe being laid across the hills of Pennsylvania for the War Emergency Pipelines, Inc., 24-in. crude-oil line to the East Coast by Oklahoma Contracting Co.

A Survey of Crude Pooling

Pooling of crude supplies, now under way to a limited extent in District 2 at instigation of PAW, has not been applied to the other four districts, an investigation this week by The Journal discloses. Refinery operations may be more directly regulated by PAW if and when supply shortages impair maximum war production. A survey of conditions reflected by the accompanying reports from operating centers in the five PAW districts, shows that other expedients are being taken in Districts 1 and 3 but that Districts 4 and 5 are not yet involved in refinery shortages.

HOUSTON, Tex.—Equitable distribution of crude-oil supplies among refiners of District 3, comprising New Mexico, Texas, Arkansas, Louisiana, Mississippi, and Alabama, has been in operation, through a system of allotment, for months, according to refiners. The system, sometimes referred to as "pooling," was devised to achieve the highest possible output of critical war products and of products essential to war industries, with minimum consumption of crude, at the same time seeing that these products are moved to the points where they are needed with the smallest possible draft upon transportation facilities, already overtaxed.

When the system was initiated early last year minor difficulties common to such undertakings were encountered, but refiners entered the plan in a spirit of cooperation and with a realization of the war's claims upon them. The result is that today every barrel of crude available in this territory is believed to be going to the spot where it can be used to the best advantage. Plant facilities, nearness to the source of raw material, transportation advantages, and labor supply are among factors studied in determining just what quantity of crude should be allotted to each refiner. But standing out high above all other considerations is that of transportation. Beside it the rest seem relatively insignificant. That problem, plaguing the oil industry at this juncture, is by way of being solved.

Local Committee Reviews Appeals

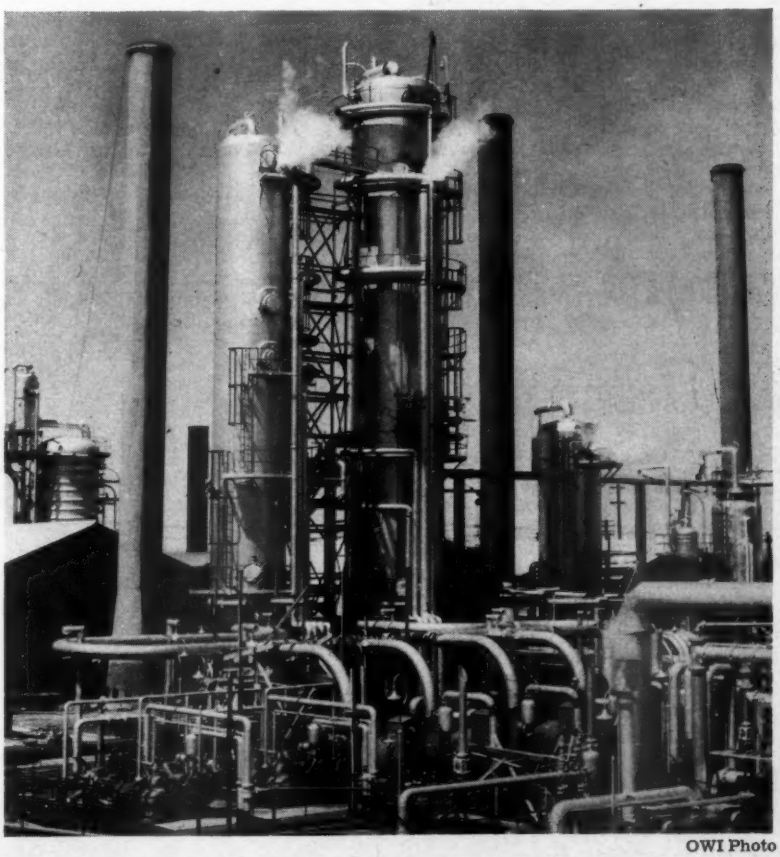
The administrative setup under which the system functions, by directive of the petroleum administrator in Washington, D. C., begins with the refining committee of District 3, which holds meetings in various parts of the district, including Houston, Beaumont, and Port Arthur, Tex. Each application for increased crude supply is presented to this committee.

The refining committee is headed by John Newton, vice president and general manager of Magnolia Petroleum Co., Beaumont. Mr. Newton and the other members of the committee, including leading refinery executives of District 3, all working without compensation, take much time from their own business to attend to the demands of the committee. They often spend several successive days at places where meetings of the committee are held.

The applicant for additional crude is questioned concerning his needs, plant capacity, shipping conditions, and his facilities for making not only gasoline of the grades to meet war needs, but products required in essential war industries, such as fuel oils, lubricants, etc. A recommendation is agreed upon by the committee. Sometimes the application is approved without change. Sometimes a cut is recommended. In any case, the recommendation of the committee goes to E. D. Cumming, director of refining, in Washington. The last to act on it is Ralph K. Davies, deputy petroleum administrator.

In most cases the original recommendation of the committee receives final approval, without revision. Sometimes, however, the deputy petroleum administrator makes some change owing to information concerning certain Army and Navy needs not yet in the hands of the committee.

The word "pool" seems to be a misnomer so far as it implies existence of stocks of crude turned over by certain refiners for allotment under government supervision to refiners whose supplies are inadequate. The refining committee has access to detailed records of the production committee which show surplus stocks of crude wherever they may be in District 3. If a refiner's request for increased supplies is approved, he is told to get them, and transfer of the oil is effected by the refiners them-



OWI Photo

Maximum output of war products from refining facilities such as this unit is the PAW objective in allocating crude in District 2 and the exchanges of certain fractions in Districts 1 and 3

selves. The refining committee assures itself later that the recommended action has been taken.

Although the refining committee occupies a position peculiarly susceptible of misunderstanding and criticism, there have been few complaints. Its recommendations are described as fair and equitable, untouched by favoritism and looking solely to the most efficient utilization of a vital resource. Refiners say the committee's recommendations are arrived at by wholly impersonal methods and with a thorough knowledge of the oil industry in general and of its operation throughout District 3 in particular.

More Companies Brought Into District 2 Crude-Pooling Plan

ADDITIONAL companies this week were reported to be contributing to the crude-oil pool in District 2 (Middle West, Oklahoma and Kansas) through which supplies are being made available to a select group of refineries in that area. The original plan which was promulgated through the supply organization of PAW's District 2 office at Chicago, provided for the collection of 40,000 bbl. daily of crude oil from crude-oil purchasing and refining organizations in District 2.

Most of the larger pipe-line companies and approximately 20 local refining organizations in District 2 are furnishing the crude in quantities that range from 100 to 5,000 bbl. daily. Most of the crude is going to independent refining organizations east of the Mississippi River in District 2 with smaller quantities to a few plants west of the river.

Reports indicate that there has been confusion in the application of this plan. It is working a hardship on practically all companies that are tendering crude oil to the pool. It is pointed out that in the case of the smaller refiners, the reduction in crude runs to stills at their plants means increased costs per barrel of crude oil refined. It has been stated that war agencies expect to compensate refiners for these increased costs but no plan has been suggested or definitely promised. In the case of the major pipe-line companies the crude oil can only be supplied by withdrawing from storage or through reductions in operations at the larger refineries to which they are connected.

Some adjustments in the original allocations to the pool have been made over the past week and it is expected that additional revisions will be made. Plants east of the Mississippi River are being favored, it is explained, because of their location in regard to rail shipping facilities to District 1 and because truck deliveries can be made to most points in the Middle West. PAW officials have explained that, in addition to transportation, the needs of refineries producing war products are given first consideration. No details regarding the application of the plan have been given out by Chicago or Washington officials of PAW.

Plan Temporarily Shelved in Rockies

DENVER, Colo.—The pooling of crude-oil supplies in District 4 has been given consideration by PAW and the petroleum industries committees, but so far the surveys indicate no marked advantage can be realized in such a program for this district and no formal action has been taken. The reason for this is that the crude moves directly from the fields to the refineries which process it and there are practically no crosshauls involved. The problem, therefore, is not considered of sufficient importance to warrant the undertaking of pooling agreements.

The situation in regard to petroleum products was not quite so simple and the supply and distribution committee acting under PAW has done considerable work in adjusting conditions to the most economical basis. This was done by promoting the exchange of products among the different companies so as to eliminate crosshauling and save transportation by both rail and truck and approximately 100 exchanges have been worked out affecting a substantial proportion of the total consumption of refined products in the district. Through this arrangement approximately 50 per cent of all tank cars formerly used in this territory were released to help out in the movement of petroleum products from Texas and the Mid-Continent to the Atlantic seaboard. The program is practically completed except for some adjustments involving long-distance hauls within the district which possibly can be supplied with less waste from one of the adjacent districts.

Surveys have been conducted in two of the principal counties in each of the states in the district looking to the pooling of facilities for joint use, including bulk and service stations. A meeting of the subcommittee of the marketing committee will be held March 15 to consider the results of these surveys and decide upon what action shall be taken to implement them.

No Crude Pooling Move Yet Started in District 5

LOS ANGELES, Calif.—No moves have been made in District 5 to pool crude-oil supplies or to make specific assignments of refinable stocks to individual plants such as is now under way in District 2. Currently, there is a surplus of crude available to Pacific Coast refiners and plants are making the maximum volume of war products with available facilities.

C. S. Wimpress, secretary of the District 5 refining committee, feels there is no need at present for pooling crude supplies. He pointed out last week that refiners in the district could obtain additional crude from a variety of sources.

Eastern Refineries Are Interchanging Products

NEW YORK.—Extensive interchange of so-called intermediate products for the purpose of maximum production of war products at the instigation of the Petroleum Administration for War is reported in District 1. However, there is no refinery pooling program under way in the eastern manufacturing area comparable to that in District 2.

Interchange of intermediates among eastern refineries is handled along this outline: If refinery A is short of crude to the extent that production of war materials is decreased it appeals to refinery B which has a surplus. Instead of supplying crude oil, refinery B determines what product refinery A needs and supplies that fraction. If refinery A operated a catalytic cracking unit, for example, refinery B would ship gas oil to refinery A and keep everything above and below gas oil for its own requirements.

Vander Leck Made District 5 Director of Production

WASHINGTON, D. C.—The Petroleum Administration for War this week announced appointment of Laurence Vander Leck, vice president of Fullerton Oil Co., independent California producer, as director of production of District 5, succeeding Comdr. W. H. Osgood, who has been called to active Navy duty.

THIS WEEK

TRANSPORTATION—PAW decides to build southern leg of "little big inch" first. . . . Asks WPB for steel to build eastern extension, promptly. . . . Middle western refiners satisfied, IF WPB acts favorably on PAW recommendation. . . . ¶PIWC launches drive to gain industry a voice in deciding what will be done with government pipe lines when war ends. . . . Council asks for general meeting of all oil interests in Districts 1, 2 and 3 within 6 months after fighting ceases. . . . ¶Rail shipments to East Coast drop 2.8 per cent, to average of 798,274 bbl. daily. . . . Overland deliveries to New England average 196,807 bbl. daily, up 39,528 bbl., easing pinch in that section. . . .

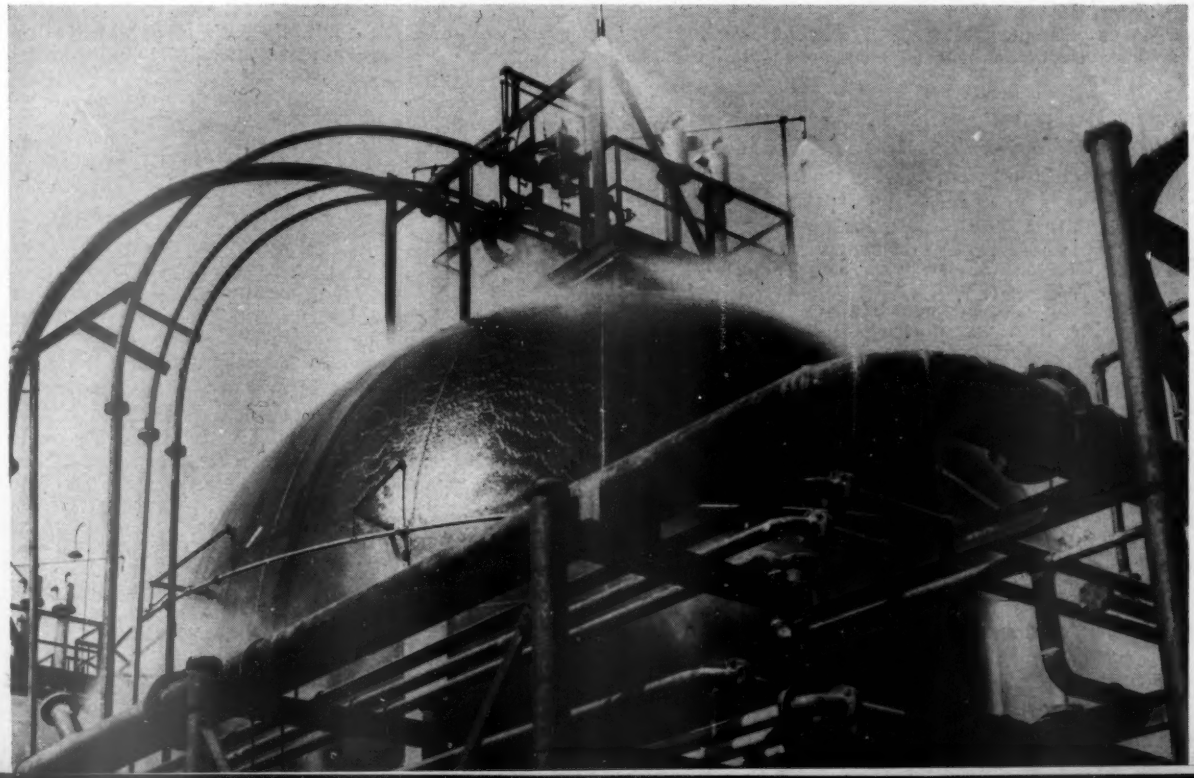
REFINING—WPB cancels preference ratings for Magnolia and Standard of Indiana butadiene plants, at Wood River and Beaumont. . . . Plants had been dropped from program earlier, withdrawal of priorities a mere formality. . . . ¶Adjustment of crude supplies continues in District 2, BUT PAW continues to withhold details. . . . Calls on purchasers and refiners now total about 37,000 bbl. daily which is distributed to other plants where shortages prevent maximum efficiency, either in output of war products or in shipping to East Coast. . . .

SUPPLIES—East Coast stocks remain critical; HOWEVER, heating season end in sight, lifting PAW's hope for modification of critical conditions. . . . ¶Navy anticipates need for 208,000 bbl. of fuel oil daily this year, 268,000 in 1944. . . . ¶OWI lifts secrecy veil slightly on military consumption in Tunisia, to show why civilian restrictions are necessary. . . .

MARKETS—Price ceilings on fuel oils revised, extending gravity graduation to all areas. . . . Refiners discount OPA's prediction that its action will substantially increase supplies of burning oils. . . . Adjustment does not compensate for higher refinery yields, simply maintains previous ceilings. . . . BUT refiners may now approach previous realizations on kerosene, other distillate fuels blended with residual, which was prevented in most parts of the country before. . . . ¶Oklahoma congressional delegation reports Administrator Ickes will recommend 25-cent crude price advance to OPA. . . .

EQUIPMENT—Lend-lease unfreezing 57,000 tons of tubular goods to domestic operators. . . . ¶PAW now issuing certificates under Controlled Materials Plan. . . . Full program involves revision of P-98-b, after which full explanation of details will be issued. . . . Meanwhile, operators advised to continue equipment negotiations under present P-98-b. . . . ¶Manufacturing facilities becoming less congested, critical metals prevent more liberal distribution of oil-country supplies. . . . Easier situation in prospect, based partially on availability, partially on necessity for more exploration generally, higher production locally. . . .

A butadiene storage tank at United States Rubber Co.'s New England synthetic plant completely enveloped in water spray. This cooling system, which operates both automatically and by hand, prevents undesired polymerization from the development of pressure and heat



McCollum Takes High Production Office With Jersey Company

THE second ranking position in Standard Oil Co. (New Jersey) foreign subsidiaries' producing operations last week was assigned to L. F. McCollum, who retired as president of Carter Oil Co., Tulsa, in order to accept the promotion in New York. Mr. McCollum will become executive vice president of the Jersey company's foreign producing companies, working under C. H. Lieb, another former president of the Carter company.

Mr. McCollum, who will go to New York in the latter part of March, became president of Carter May 1, 1941, succeeding J. J. Conry. He joined the Carter organization May 1, 1934, as manager of the exploration department and became executive vice president January 1, 1938. From July 1925 until joining Carter, Mr. McCollum was a geologist for Humble Oil & Refining Co.

Schorp Started in Mexico

O. C. Schorp, executive vice president of the Carter company since May 1941, became president March 6, the effective date of Mr. McCollum's retirement. John W. Brice, vice president in charge of exploration and research for the Carter company since April 1, 1942, succeeds Mr. Schorp as executive vice president.

Mr. Schorp started in the oil business with Cia. Transcontinental de Petroleo, S.A., a Jersey company affiliate at Tampico, Mexico, in May 1920, as superintendent of commissaries at Las Matillas. He became assistant warehouseman and superintendent of materials within a year. In 1925, he went with Andian National Corp., at Cartagena, Colombia, as materials agent and 2 years later he returned to C.T. de P. at Tampico as superintendent of the material division. Mr. Schorp transferred to Standard Oil Co. of Venezuela, Maracaibo, in 1929 as local purchasing agent and assistant head of the material division. Eighteen months later, he was promoted to superintendent of the marine and land departments. Mr. Schorp joined Standard of New Jersey, New York, in 1934, as head of the material division of the producing department. In 1937, he was assigned to the administrative division of the producing department of the company and served as special representative and agent for Carter and Standard Oil Co. of Louisiana (producing department). He joined Carter as vice president and manager of production in October 1939, and in 1941 became executive vice president.

Mr. Brice was employed by Humble as a geologist in 1927 and, in 1930, he accepted the position of division geologist for Standard of Venezuela of which he became chief geologist in 1934. He was recalled to New York in 1937 to handle production matters for Standard of Venezuela and, in 1939, returned to Venezuela as assistant general manager of the company. He came to the Carter company direct from Venezuela.

20-Odd HF Alkylation Units Are Under Construction

Further proof of the growing importance of alkylation processes in wartime production of engine fuels comes to light in the announcement by Universal Oil Products Co., Chicago, that more than 20 alkylation units are operating or building, plants which employ anhydrous hydrofluoric acid, HF, as catalyst. These units are scattered throughout the country. their individual capacities and plant locations are a military secret but it is known that a large percentage of the rapidly growing demands for aviation fuel are or will be met by these units when they get under way.

This process, a product of depression-fostered research, was adopted extensively when the mounting aviation-fuel demands began to tax existing facilities. It permits the alkylation of propylene, butene and pentenes with isoparaffins to make the most important components of aviation superfuels, isooctane and similar products. Highly reactive, HF boils at about average atmospheric temperature (+67° F.), becomes highly corrosive to many materials when small amounts of water are present and is maintained in essentially the dry state for its best efficiency. It appears to be a very efficient catalyst, is easily recoverable with small loss, easily removed from reaction products for recycle and may be almost completely eliminated from products by simple means, technologists claim.

In view of the huge quantities of raw materials which are available in this country, this process will be as advantageous in peacetime as in war since the product may be used to improve the qualities of motor and commercial aviation fuels as well as for military fuels, all of which will be in greater demand after the war.

L. F. McCOLLUM

O. C. SCHORP

JOHN W. BRICE

PIWC's Postwar Planning Organization Is Set Up

WASHINGTON, D. C.—Authorization of a study of postwar readjustments by a newly appointed group of oil men under the chairmanship of Paul Ryan, of Cleveland, Ohio; recommendation of authorization for the completion of the 20-in. products pipe line all the way from the Gulf Coast to the East Coast; a request for a minimum increase of 1 cent a gallon in the retail price ceilings for gasoline, and request for permission to promote a nation-wide campaign to remove unnecessary traffic lights and stop signs occupied the Petroleum Industry War Council at its meeting last week.

The postwar study will be started at once. The subcommittee's work will be supervised by the council's committee on petroleum economics, of which Dr. Robert E. Wilson, president of Pan American Petroleum & Transport Co., is chairman. Mr. Ryan, who has accepted the full-time post as chairman of the working subcommittee, will serve without compensation. Mr. Ryan is former president of National Refining Co., and brings to his new job much experience in both the technical and managerial sides of the oil industry.

The committee will attempt to analyze and predict the economic conditions which are likely to prevail after the war, and to work out plans to help solve the problems.

Twelve Committeemen Selected

Twelve members already have been appointed to the subcommittee, and others will be added soon to make it representative of all branches and functions of the industry in all parts of the country and of large and small companies. In addition to Mr. Ryan, the members already appointed include: Sidney A. Swensrud, Standard Oil Co. (Ohio), Cleveland, who is vice chairman; Danial P. Barnard, Standard Oil Co. (Indiana), Chicago, Ill.; C. L. Burrill, Standard Oil Co. of New Jersey, New York, N. Y.; Thomas G. Elder, National Refining Co., Cleveland; Robert W. McDowell, Mid-Continent Petroleum Corp., Tulsa; William G. Moore, Gulf Oil Corp., Pittsburgh, Pa., George G. Oberfell, Phillips Petroleum Co., Bartlesville, Okla.; T. E. Swigart, Shell Pipe Line Co., Houston, Tex.; James Tanham, Texas Co., New York; Eric V. Weber, Eureka Oil Co., Cincinnati, Ohio and Ralph Zook, Sloan & Zook, Bradford, Pa.

Materials for the first half of the 20-in. petroleum products pipe line have already been authorized, and Petroleum Administrator Ickes has requested materials for the remainder of the line. The council also passed an accompanying resolution calling upon PAW, or any successor agency, to call the industry into conference after the tanker emergency is passed or at any event, within 6 months after the end of the war, to determine the disposition and future use of all pipe lines built with government funds.

Paul Ryan of Cleveland, former president of National Refining Co., has accepted full-time post as chairman of the working subcommittee, conducting PIWC's study of postwar readjustments in oil industry

The request for a minimum increase of 1 cent in the retail price ceilings for gasoline was made to partly cover the increased costs of distribution caused by rationing and the impact of war. Rationing has increased operating costs because of the reduction in volume and because of the expense of handling coupons. In addition, the war has brought added expense because of increased labor and general overhead costs.

Elimination of unnecessary stop signs, traffic lights and prohibitions against U-turns and left turns would enable motorists to obtain greater mileage from the gasoline allotted to them under rationing. The council recommended that Mr. Ickes direct the industry to put on a national campaign among state and local legislative bodies and to public officials, to obtain the elimination of all traffic regulations that are unnecessary for safety under present reduced traffic conditions.

Another resolution of the Council asked that everything possible be done to permit maximum deliveries of fuel in order to spread distribution over the summer months, and to eliminate small, special, and rush deliveries next winter to save irreplaceable truck equipment, gasoline, rubber and manpower. The council also warned that failure to provide additional transportation facilities to build up stocks from their present critical levels invited a recurrence of serious shortages for civilian needs and may even interfere with regular and orderly supply of petroleum products for military needs.

Committees Working on Tulsa Meeting of A.P.I.

Committees are now working on arrangements for the spring meeting of the Mid-Continent district, A.P.I. Production Division which will be held in Tulsa May 20-21. P. H. Bohart, Gulf Oil Corp., Tulsa, is chairman of the general committee on arrangements.

J. R. Evans, Stanolind Oil & Gas Co., Tulsa, is chairman of the program committee. Serving with Mr. Evans are W. B. Berwald, Ohio Oil Co.; R. C. Earlougher, Geologic Standards Co., and F. R. Wheeler, Barnsdall Oil Co., all of Tulsa, and J. S. Montgomery, Phillips Petroleum Co., Bartlesville, Okla.

F. E. Bernsen, Lucey Products Corp., Tulsa, is chairman of the entertainment committee, and H. F. Beardmore, Amerada Petroleum Corp., Tulsa, is chairman of the committee on hotel arrangements and registration.

Herbert L. Goodpaster, Phillips Petroleum Co., Great Bend, Kans., chairman of the Mid-Continent district, soon will appoint other members of the hotel and entertainment committees.

Chapel Hill Operators Must Get Special Permits

WASHINGTON, D. C.—The Chapel Hill field in the east central part of Smith County, Texas, has been classified as a condensate field through Interpretation 3 of Conservation Order M-68, issued by the Petroleum Administration for War.

This classification means that the automatic drilling and well-spacing provisions of M-68 do not apply, and special permission must be obtained from PAW to drill any well in that field. Operators seeking to drill are asked to send three copies of their applications to PAW headquarters in Washington and one copy to the PAW Houston office.

State Capitals

CALIFORNIA

THE CONTRACT entered into by Standard Oil Co. and the Navy Department whereby Standard surrendered its holdings in the Elk Hills naval reserve and agreed to develop the field in accordance with Navy requirements at a cost basis may result in an investigation because Chairman Sheppard of the House appropriations subcommittee thinks it sets a precedent by placing the Government in partnership with a private concern.

There is no partnership arrangement existing because Standard released its property to the Navy on the basis of a survey to be concluded in the future when more data are available with respect to the amount of oil and gas in the structure below Standard's properties. The Navy Department wanted the property and Standard conveyed its properties on the understanding that they would be paid for at a later date. Thus the $2,900,000 appropriation that was held up pending closer scrutiny was to be spent under Navy supervision for development of the Navy's reserve. A superficial survey made some time ago revealed that 36 per cent of the reserve at Elk Hills was located beneath Standard's properties and that the remaining 64 per cent was located beneath government property.

COLORADO

A BILL is pending in the Colorado general assembly which proposes to create a state power authority under a nine-man board to acquire and operated state-owned public utilities.

Purpose of the measure is to empower the state to acquire the properties of the Public Service Co. of Colorado, which serves Denver, Pueblo, and numerous other cities and towns in the state. The company, a subsidiary of Cities Service, faces the so-called "death sentence" under the SEC holding-company act, which may or may not apply to this company at some indefinite date. The bill has raised a major issue which has aroused extensive controversy and its fate is uncertain.

Public Service owns hydroelectric and steam-power plants which serve its needs, but the natural gas it distributes is purchased under contract from producers in the Texas Panhandle. The measure provides for the exploration and development of natural gas in the state to supply Colorado's needs. Should the measure become a law in its present form, Colorado would have the power as a commonwealth to engage in the oil and gas business.

SOUTH DAKOTA

A PROPOSAL to offer a bonus of $25,000 for the first oil discovery in the state has been approved by the house of representatives by a vote of 70 to 3. The bill previously had passed the senate and will become a law upon approval by Gov. M. G. Sharpe. The measure requires production of not less than 10 bbl. per day for a period of 90 days.

TEXAS

THE STATE-WIDE proration hearing this month will be held March 18 at Houston, Tex., the Railroad Commission announced last week. Purchasers were instructed to submit certified nominations at the hearing, both for crude oil and natural gas to permit the commission to gage the market demand in April.

OIL MEN IN TEXAS are voicing opposition to the proposed bill now in the house to permit unitization of oil leases for drilling and operation. The bill, some spokesmen say, if passed in its present form, would permit any amount of acreage to be held by production of one well, retarding necessary drilling for economical recovery.

ACCORDING TO FIGURES released by the Railroad Commission March 2, there were 30 producers added in the state for the week ended February 27, and during the same period there were 40 wells abandoned, one gas well completed.

OIL MAN GOVERNOR

Gov. Edward Martin of Pennsylvania is the first oil man in history to head the government of that commonwealth. He is president of the Dunn Mar Oil & Gas Co. of Washington and Waynesburg, Pa., which operates properties in the Southwest Pennsylvania district and in Ohio.

OHIO

REP. GILBERT M. FRASH, from Morgan County, wants to make it compulsory to operate all leases within the state on a ⅛ royalty basis both as to oil and gas. His bill (H. B. 31) was referred to the committee on mines. At a meeting February 15, it was the consensus of representative oil and gas producers of the state that this proposal would be an unjustified restraint on the freedom of land owners to deal with their own property. Several expressed opinion that the bill, if enacted, would be unconstitutional. The hearing was continued and the committee adjourned without taking any action.

A BILL known as S.B. 160 has been introduced in the legislature authorizing the governor of the state to enter into the interstate compact to conserve oil and gas. The bill was introduced by Senator Meacham of Athens.

LOUISIANA

ALLOWABLE production of 348,148 bbl. daily in March was fixed last week by the state Conservation Department, an increase of 7,291 bbl. over the February quota. Earlier, the PAW recommended a daily quota of 349,800 bbl. daily in March. South Louisiana fields were assigned 262,693 bbl. of the daily allowable in March, against 256,139 bbl. in February. North Louisiana's allowable was set at 85,455 bbl. this month, compared with 84,718 bbl.

ARKANSAS

TENTATIVE date for the next state-wide proration hearing before the Oil and Gas Commission has been set for March 25. Previously, the commission had planned to hold the hearing March 18.

the OIL AND GAS JOURNAL

PRODUCTION - TRANSPORTATION
REFINING - NATURAL GASOLINE

Founded in 1910 by
PATRICK C. BOYLE

An Encouraging Reaction

THE wide interest manifested by operators and others in the latest reports on petroleum reserves in this country is a healthy development.

The oil industry generally has been too slow in appreciating the full significance of surveys which have revealed from time to time the status of underground reserves whose presence has been definitely established by the drill. Many have failed to realize that the advent of proration and the acceptance of conservation methods in operations made these data the most important guide the petroleum industry has as to where it has been and where it is going.

If this vital fact had been fully evaluated in the late thirties and less attention had been paid to the ups and downs of aboveground storage—no longer of controlling importance—the industry's markets at that time would have been established on a more satisfactory basis, a needed adjustment which would have carried over to the present emergency.

But, it has been contended by some, the figures on reserves are not in agreement. As has been pointed out in recent discussions, there are no important differences in the reports of the PAW, the A.P.I. and this publication in regard to the status of reserves at the start of this year. Inevitably there are minor variations in procedure in estimating old and new fields but it so happens that all arrive at the same general conclusions.

At the beginning of the year it is first necessary to re-evaluate the fields that are one to 75 years old. Invariably for the country as a whole these areas are revised upward reflecting improved recovery methods and information not available a year earlier. These revisions accounted for a large part of the additions to reserves last year.

The point to remember here is that these additions, while important, are not due to the discovery of new fields. They are not the answer as to how this country is to be assured the oil that it will need this year and later. Furthermore, these additions are settled production in the highest cost brackets.

The most important information is that which shows the discoveries of the past year and the revisions for the fields which were only partially developed when the previous report was completed. Development in most areas, in contrast to the situation a few years ago, is gradual and the reserve appraisals made a few weeks or a few months after discovery usually are revised upward as additional wells are drilled. The three reports were in agreement that the reserves represented by these new discoveries and extensions were substantially less than production last year.

Operators should be encouraged to make every possible check on their own reserves. Special studies by districts by those most familiar with reservoir conditions are highly desirable. No activity will contribute more to the stability of the oil business than accurate continuous reports on underground stocks.

Also it is apparent that the investigations, particularly in times like these, should go further than quantity. The refining characteristics of the new crude-oil supplies should be analyzed and their availability in regard to transportation determined.

Finally, more attention must be paid to economics. The questions as to what it costs to find new oil and the increased expenditures in bringing reserves to the surface should be answered in such a manner that certain Washington agencies will understand and act accordingly.

Air-Cargo Carriers Here to Stay

POSTWAR OUTLOOK

This discussion of fuel and lubricants for cargo planes, taken from a review to appear in the forthcoming issue of The Lamp, Standard Oil Co. (New Jersey) publication lays a predicate for appraisal of postwar possibilities in world-wide use of air-freight transportation. Conclusions point to superplanes and the use of highest quality fuel for maximum power.

CARGO planes the size of the famed and feared B-24 Liberator—and some much smaller—are delivering ordnance and other supplies in North Africa and in the South Pacific. The Air Transport Command, under Brig. Gen. Harold L. George, is performing daily miracles.

These imagination-stirring air-cargo carriers are here to stay. In coming years the aviation industry will undoubtedly perform feats beyond even its wartime achievements. In addition to cargo planes, gliders may be developed to carry express freight behind tractor planes; the technique for this has already been developed in connection with transporting troops. Larger and more luxurious aerial passenger liners will bridge the skies over the oceans as peace brings resumption of world travel. We will probably see a further extension of air mail and express.

Even with our present knowledge of power and aerodynamics, the size of the craft which designers and engineers could put into the skies, were they called upon to do so, would stagger a Jules Verne.

It is fuel that is the priority passenger on every flying freighter.

Fuel, and the extent to which it can be made available along the way, determines the routes.

Fuel will dictate how much cargo may be carried.

Fuel will help design the planes of the future, each suited to its particular trade.

But in the meanwhile, enthralled by feats of globe-spanning transportation, is it possible that we run the danger of thinking of great military air fleets too much in terms of steel, aluminum and plant capacity, and not enough in terms of the fuel to fly them?

Potentialities of Cargo Planes

Let's look at these cargo planes, at their stimulating potentialities and at the conditions of their most practical use in wartime. In reviewing the picture it is important to remember that under present war conditions all supplies of aviation gasoline must be hauled overseas by tankers —for with the loss of the Netherlands East Indies there is little 100-octane refining capacity on the other side of the world.

If one of the mammoth cargo planes we have been hearing about were to lift its 250,000 lb. over San Francisco and, with its six engines beating steadily, head for Australia with enough fuel for the 16,000-mile round trip, the quantity of military supplies it could carry would be exactly nothing.

If a 70-ton aerial freighter similar to the Mars, largest transport now in existence, were to load enough fuel for a 12,800-mile round trip to Egypt, it too would have to fly without cargo.

As for the medium type of carrier similar in performance to the B-24 bomber, the only route it could negotiate with enough fuel for the round trip would be the comparatively short 7,700-mile New York to London run.

None of these planes has provision for such a fuel load. Cargo planes are actually delivering military supplies to far corners of the earth; they are able to do so because tankers are ferrying aviation gasoline and engine oil over four oceans to refueling stations that punctuate the routes of the flying freighters.

On some routes cargo planes will need as many tankers to haul fuel for them as they replace in ocean freighters.

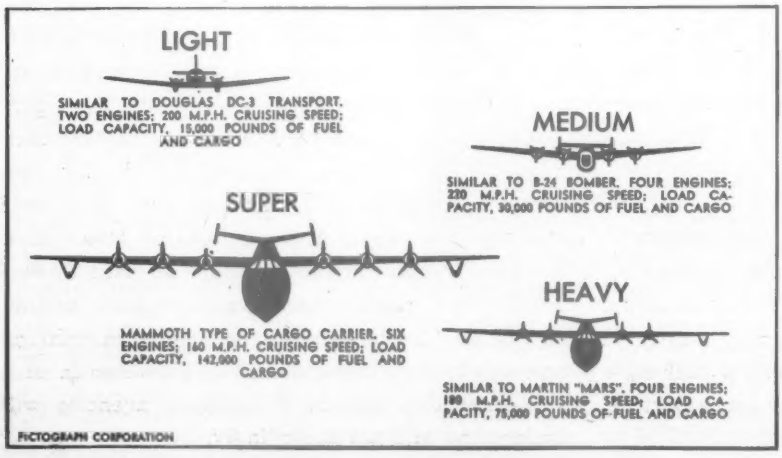
The military value of the cargo plane lies in its flexibility, its speed in getting vitally needed equipment to the fighting fronts, its safety from surface or submarine attack, and the number of ships it replaces.

Most of these qualities the plane will always have. But aside from the heaviest type of carriers, of which only a few have been built so far, every cargo plane now in operation on overseas lanes requires more tankers to keep it in service than it replaces in freight ships.

Present cargo planes operating on long overwater routes (that is, the "light" and "medium" types) consume from 1 to 4 tons of fuel for every ton of cargo carried, even under the most efficient operating conditions. Most of that fuel, as we have already noted, has to be carried overseas by tankers.

For this reason it would appear that, in using light and medium cargo planes for transocean hauls of military supplies, the cargo tonnage replaced may be offset by the tanker tonnage needed to carry fuel for the planes under conditions of wartime operation.

And if we consider the question from the standpoint of safety from submarine and sea-raider attack, we come face to face with the realization that, like freighters, tankers carrying the planes' fuel are also vul-


LIGHT
SIMILAR TO DOUGLAS DC-3 TRANSPORT. TWO ENGINES; 200 M.P.H. CRUISING SPEED; LOAD CAPACITY, 15,000 POUNDS OF FUEL AND CARGO
MEDIUM
SIMILAR TO B-24 BOMBER. FOUR ENGINES; 220 M.P.H. CRUISING SPEED; LOAD CAPACITY, 30,000 POUNDS OF FUEL AND CARGO
SUPER
MAMMOTH TYPE OF CARGO CARRIER. SIX ENGINES; 160 M.P.H. CRUISING SPEED; LOAD CAPACITY, 142,000 POUNDS OF FUEL AND CARGO
HEAVY
SIMILAR TO MARTIN "MARS". FOUR ENGINES; 189 M.P.H. CRUISING SPEED; LOAD CAPACITY, 75,000 POUNDS OF FUEL AND CARGO
PICTOGRAPH CORPORATION

nerable to torpedoes and shell fire.

The cargo plane has, of course, a definite job to perform. Where speed is vital, or cargo is very valuable in proportion to weight, or where the destination is inaccessible to other transport, the plane is a logical instrument.

While exact figures are miltary secrets, it is possible from various published sources to gain a rough idea—at least for the purposes of estimating requirements of 100-octane gasoline, tankers and steel—of the number of cargo planes we may be able to put into the air through the next year or so. These are shown in the accompanying table.

Auxiliary Steel Requirements

Not all the steel goes into planes. To construct and maintain in service a fleet of 1,000 cargo planes of the heavy Mars type would require 270,000 tons of steel—but only a small part of it in the planes themselves. Requirements (assuming 8 hours a day average operating time) are:

	Tons
For 1,000 planes and the manufacturing facilities to build them	50,000
For additional manufacturing plants for 100-octane aviation fuel	120,000
For new facilities for making aviation lubricants	20,000
For tanker construction to transport aviation gasoline to refuel cargo planes	80,000
Total	270,000

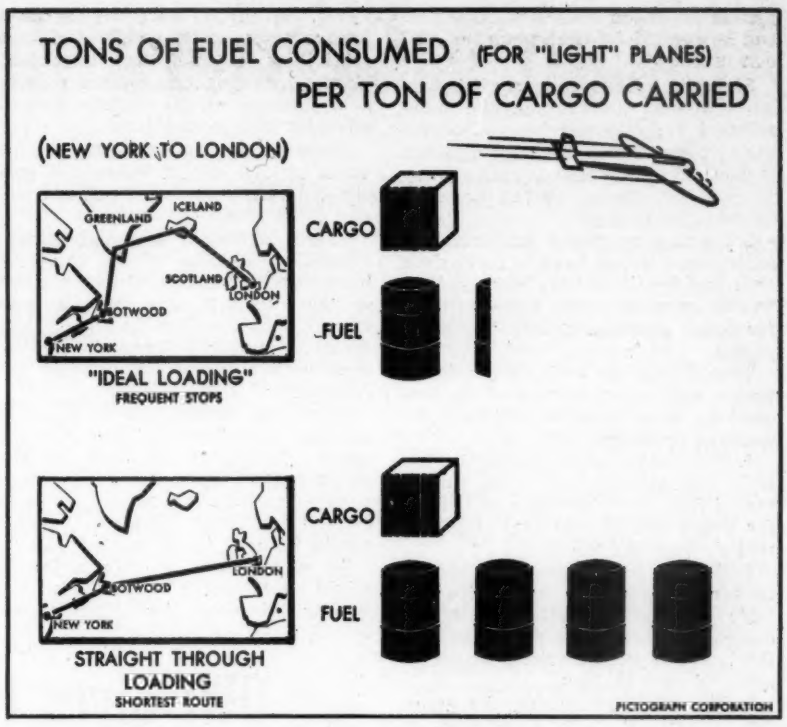
The same ton-miles of transportation obtained from 1,000 cargo planes under war conditions could be furnished by 20 cargo vessels with an expenditure of only 70,000 tons of steel.

How do cargo planes compare with ships as carriers of military supplies?

A cargo plane is about 20 times as fast as a ship and is much more flexible. It does not have to unload its cargo at the seacoast—possibly under bombardment—but can deliver it direct to its destination.

Planes have taken concentrated food, machines and surgical instruments to Great Britain, Russia and India. They have taken replacement parts for planes and tanks all the way from the United States to the British 8th Army in Africa.

When it comes to long overwater transportation of strategic materials by cargo plane, one factor to be considered is the number of tankers required to haul fuel for the planes, as against the number of ocean freighters they replace.



One of the most important considerations in connection with the military use of cargo planes is the frequency of refueling stops.

To show how this works, suppose we follow a shipment from New York to London.

Trace this route on the accompanying map and you will notice that there are several possible refueling points on the way—Halifax, Nova Scotia; Botwood, Newfoundland; some point in Greenland; then Reykjavik, Iceland and a stop in Scotland. The plane might refuel only at Botwood, or it might stop at any combination or all of the remaining points listed.

Likewise there is more than one way of loading cargoes for such a shipment. It might be decided to load a plane straight through for the entire trip, stopping only for refueling. Or planes could stop frequently so as to carry maximum freight, and the cargo load could be lightened or added to at each stop, depending on the amount of gasoline needed for the next leg.

On what we might call "straight through" loading, stopping only at Botwood for fuel, a "light" plane might consume 4.05 tons of fuel for every tone of cargo carried. With so-called "ideal" loading, stopping at all intermediate points for refueling, and shifting cargo as needed, only 1.29 tons of fuel would be consumed for every ton of cargo.

Comparison of Routes

If you make this same comparison with other routes to the war fronts, as indicated on the map, and with the other three types of cargo planes already described, you reach these conclusions:

1. Except on short runs and with frequent refueling, you have to carry more fuel than cargo until you reach the heavy type of plane similar to the Mars.

2. On the route from here to Alexandria, Egypt, the type of plane employed and the method of loading may make as much as an eight-fold

WHAT CARGO PLANES MEAN IN TERMS OF FUEL, TANKERS AND STEEL
(Estimated by the Lamp)

	Number of cargo ships estimated in service			100-octane requirement for cargo ships alone (bbl./day)			Tankers required for transporting fuel			Cumulative steel requirements for aircraft, fuel, tankers (tons)		
Type of plane—	Jan. 1943	Jan. 1944	Nov. 1944	Jan. 1943	Jan. 1944	Nov. 1944	Jan. 1943	Jan. 1944	Nov. 1944	Jan. 1943	Jan. 1944	Nov. 1944
Light	2,500	12,000	12,000	62,000	298,000	298,000	13.8	66.0	66.0	249,000	1,194,000	1,194,000
Medium	1,000	6,000	6,000	49,500	297,000	297,000	11.3	67.8	67.8	190,000	1,143,000	1,143,000
Heavy	....	.....	1,000	.....	.....	66,000	...	....	16.4	.....	.....	257,000
Total	3,500	18,000	19,000	111,500	595,000	661,000	25.1	133.8	150.2	439,000	2,337,000	2,594,000

difference in the weight of cargo that can be carried for each pound of fuel consumed.

Since the more frequently it is possible to stop and refuel, the more military supplies can be transported over a given route, the next question is how are these fuel supplies going to be laid down where they are needed in wartime.

Some say by aerial tankers. But such planes would have to carry their own fuel for the return journey, they would, on most routes, have no room for extra gasoline to fuel the cargo planes.

That brings us back to the lowly tanker and here are some of the conclusions that must be reached for wartime operation.

1. For cargo planes now in use it is necessary to send more than a ton of fuel over the ocean in tankers for every ton of war materials carried through the air.

2. On long routes, to supply enough tankers to maintain in service the 1,200 cargo planes called for in one contract recently awarded (assuming the heavy type of carrier), would require 20 new tankers.

3. The route permitting the greatest amount of cargo in relation to fuel consumed is the northernmost of the three laid out between New York and London. By making frequent stops for gasoline and thus cutting down the weight of fuel in the tanks, the maximum pay load can be carried.

Superplanes Most Efficient

It is clear that the most efficient cargo planes on globe-girdling routes are the heavy and the superclasses.

To maintain 1,000 heavy-type flying freighters in service over the long routes to the fighting fronts would require a substantial increase in the country's 100-octane capacity, already under heavy demand from the military requirements of ourselves and our Allies.

It is understood that the Government plans to refit a number of bombers as cargo carriers. Every time a bomber is converted for cargo use it means an increase in its 100-octane fuel requirements.

Not much is known about the type of military cargo planes now being built. Were they comparable in size to the Mars, and assuming they would spend a third of the time in the air, this 1,200-plane program alone would require about 3,300,000 gal. of 100-octane fuel a day.

Almost as monumental, particularly from the standpoint of steel required, is the problem of supplying sufficient tankers to haul stores of 100 octane to refueling point along the air cargo routes.

In peacetime this would be less of a problem because 100-octane capacity could be constructed at strategic points in other parts of the world. Even in wartime the most serious study must be given to the possibility of spotting 100-octane plants in Russia and within reasonable distance of the middle eastern oil fields of Iran and Iraq.

Every time an aircraft engine burns up 100 gal. of 100-octane gasoline, it consumes 4 to 5 gal. of aviation lubricants.

These lubricants are high-quality specialties. Because of the range of temperatures under which aircraft operate, the oils must have a high viscosity index—that is, they must shows a minimum change in consistency with extreme temperature variations.

It will be considerable of a job to provide sufficient facilities for the special lubricants required by the military-plane program and cargo carriers as well. In normal times to expand aviation-lubricant plants would be a 12 to 18 months' job.

As a corollary to this action it might be necessary to restrict all top quality lubricants for military use. This would mean the disappearance from the civilian market of premium grade motor oils.

Whether the industry can supply the fuel and lubricants to put into the air such a cargo fleet as is now being discussed depends on how rapidly the steel and other critical materials that must be allocated among various programs of strategic importance can be made available for 100-octane plant construction.

Bombers can be converted to cargo use in a comparatively short time. But it takes at least 6 months to built 100-octane plants, even longer to fabricate and erect aviation-oil facilities. Not only must we think of plane construction in terms of fuel, lubrication and other service requirements but we should plan well in advance the expansion of facilities to meet these needs. Failure to do so may mean long lines of cargo carriers unable to get into the air for lack of gasoline and oil in their tanks

The industry can do this job if it is given a green light.

OWI Gives Insight on Oil Consumed by Warfare

WASHINGTON, D. C.—Heavy fighting in Tunisia gives added importance to known facts about the consumption of gasoline and oil in combat, the Office of War Information disclosed last week. When American mechanized troops retreated through the mountains northwest of Gafsa and surged forward again with their British allies to retake the lost territory in the last weeks of winter, petroleum in large quantities was desperately important to them. According to Lieut. Gen. Brehon B. Somervell, commanding general, Services of Supply, the tanks alone in a mechanized division burn more than 10,000 gal. of gasoline in a march of little more than 100 miles. This takes no account of reconnaissance vehicles, troop carriers, ammunition trucks, self-propelled guns and armored cars.

One heavy bomber, cruising 250 miles in an hour, burns 200 gal. of gasoline; a fighter may burn 100 gal. in the same time. Moreover, when planes are hurriedly moved about to emergency fields as they have been in Tunisia, servicing them becomes a problem for motor transport and the trucks that bring in the gasoline are themselves burning petroleum products.

Under Secretary of War Patterson has indicated that to transport one soldier to Africa required the use of 7 tons of shipping, and to maintain one soldier in Africa required 1½ tons of shipping. A large proportion of these ships are oil burners. If the route were straight from the North American East Coast to Casablanca, a single destroyer on convoy duty would burn something like 214,000 gal. of heavy fuel oil in the round trip.

Compared with this colossal consumption by war, the East Coast of the United States has been getting only about 42,000,000 gal. of all petroleum products a day. And total stocks as winter drew into its last weeks were running below 40 per cent of normal. Out of this low reserve and low supply, OWI pointed out, the United States must ship by the safer and quicker eastern route increasing quantities of oil and gasoline for fighting equipment. Details of military supply cannot be revealed, but the same tankers, tank cars and pipe lines carry interchangeably these petroleum products for the armed forces:

Light fuel oils for diesel engines of submarines, coats guard cutters, military trucks; heavy fuel oil for battleships, destroyers, tankers, troop transports; 80-octane gasoline for jeeps, trucks and command cars; 100-octane gasoline for airplanes, motor torpedo boats and most tanks; lubricating oil for planes, torpedo boats and tanks; kerosene for cooking, heating and lighting in Army camps.

Ickes Asks for Steel to Extend Products Line

(Continued from Page 22)

sible with the most advantageous operation of the District 2 proposal.

4. The PAW project can be completed in a shorter time than the District 2 proposal, with resultant increased deliveries to the East Coast of from 3,000,000 to 5,000,000 bbl. during the most critical period of the shortage.

5. It is probable that the 20-in. line will have to be completed all the way from the Gulf Coast to the East Coast before the end of the current year regardless of which section is constructed initially. In that event the St. Louis extension of the District 2 proposal will become idle and will represent the wasteful use of 16,000 tons of steel. On the other hand, the PAW project is adaptable to immediate and efficient extension.

6. The railroads already have proved their ability to handle the loads which would be required by the PAW project and are indicated to have a comfortable margin of safety or capacity for handling increased volumes of traffic if the tank-car efficiencies can be improved. The District 2 proposal would place a heavy burden on the southwestern railroad facilities, leaving little, if any, remaining capacity for expansion and involving danger of loss of war-product production in case the southwestern railroads were unable to handle the tank-car load required.

7. The PAW project provides a dependable medium of transportation from the area of greatest supply, whereas the District 2 proposal would connect an area of increasing scarcity with an area of acute shortage.

8. The PAW project is superior to the District 2 proposal in terms of materials, power and equipment required, completion date, deliveries of petroleum to the East Coast, and intangible railroad and supply considerations; the District 2 proposal has no demonstrable advantage in any respect.

New Research Assistantship In Petroleum Physics

A research assistantship in petroleum physics has been established by Gulf Oil Corp. at Massachusetts Institute of Technology. The recipient must qualify for a tuition scholarship and be a candidate for an advanced degree in the department of physics. The income will be $1,100 per school year, subject to renewal at the end of 9 months under an accelerated program. Application should be made before April 1 on forms obtained from the admissions office of the institute, Cambridge, Mass.

Federal Order Digest

OPA Price Actions

Fuel Oil—RPS 88, Amendment 79: Sets up dollar and cents ceilings on fuel oil on gravity basis, dividing country into areas in which specific prices apply, effective March 3.

Fuel Oil—RPS 88, Correction to Amendment 69: Redefines products to which price ceiling order applies to eliminate asphalt which is now under separate regulation, effective March 6.

OPA Rationing Rules

Gasoline—RO 5c, Amendment 27: Allows an extension of time for turning in gasoline coupons covering purchases of eastern dealers, distributors and others who get supplies direct from pooling terminals set up by PAW, effective March 10.

Fuel Oil—RO 11, Amendment 42: Places rationing of kerosene and fuel oil for farm vehicles and machinery, noncommercial cooking and lighting and similar uses on 6-month basis, to reduce trips consumers must make to local boards, effective March 10.

Fuel Oil—RO 11, Amendment 43: Simplifies procedure by which householders may obtain additional heating oil for the care of ill or infirm persons, removes requirement that certificate must be presented from qualified plumber, architect or heating engineer, effective March 11.

PAW Regulation

Petroleum Supply—PAO 1, Amendment 1: Sets quotas for distributors of gasoline in the eastern area, effective March 3, for remainder of month.

WPB Priority Orders

General Scheduling Order—M-293: Formalizes existing scheduling practices and provides regular procedures for future contingencies, for breaking production bottlenecks. Order provides specific regulations covering manufacture and distribution of critical components such as valves, pumps, fittings, and bearings, effective, issued February 26.

Steam Equipment—LO L-154: Revoked, because use of certain metals in manufacture of feed-water heaters is adequately controlled under GLO L-172, issued March 1.

Valves and Parts—LO L-252: Revises order limiting the number of types of gate, globe, angle, cross and check valves to correct errors in original version, issued March 2.

Steel Products—SO M-21-b, amended: Permits acquisition of restricted amounts of any products in excess of established quotas for the first quarter of 1943, to facilitate rebuilding of warehouse stocks before introduction of CMP, issued March 6.

Priorities System—PR 11, Interpretation 1: Permits use of PRP ratings for acquisition of cranes and monorails costing less than $200. Cites that CMPR 5 will govern in maintenance, repair and operating supplies after March 31, issued March 1.

Copper Chemicals—PO M-227, amended: Places allocations of copper chemicals on a quarterly basis, instead of monthly, to enable producers and consumers to plan operations over a longer period, effective March 5.

Copper—GPO M-9-a, amended: Places control of warehouse sales of brass and wire-mill products entirely under CMPR 4, placing quantity delivery restrictions on warehouses, effective March 4.

Pipe Flanges—LO L-42, Schedule 2 amended: Permits greater use of gray cast iron and malleable iron in pipe-flange manufacture, to reduce demand for steel flanges, effective March 3.

Construction Supplies—PRO P-19-h: Broadens types of materials which may be assigned preference ratings; covers tools repair parts, construction-machinery parts, scaffolding and the like, effective March 1.

Fuel Oil—PREO M-144: Revokes order issued May 5, 1942, which excluded use of preference ratings in fuel-oil sales.

Fuel Oil—PREO M-201: Excludes use of preference ratings in fuel-oil sales, replaces M-144, effective March 3.

Controlled Materials—CMPR 7: Provides a single standard form of certification for validating any delivery order under CMP, eliminating necessity of placing several different certifications on single order, issued March 2.

Controlled Materials—CMPR 1, 3 and 4, amended: Establishes procedures for contingencies not previously covered, effective March 1.

Air-Cooled Engines—LO L-254: Limits the number of engine models which will be produced, prohibits manufacture or assembly of all types, except those listed in Schedule A, effective March 15.

Crude Demand Rises 8 Per Cent, Bureau Of Mines Concludes

WASHINGTON, D. C.—Market demand for crude oil this month is caluculated at 3,912,900 bbl. daily, an increase of 274,900, or 8 per cent, over the actual for March, 1942. This calculation was reached by the Bureau of Mines in its regular monthly forecast prepared under the supervision of A. G. White, chief, Petroleum Economics Division, Economics and Statistics Service.

The Bureau's figures for the fourth quarter of 1942 show a total actual demand for motor fuel of about 150,300,000 bbl., daily average crude runs of 3,718,000 bbl., and a daily average demand for domestic crude petroleum of 3,934,000 bbl. Compared with the forecasts, total motor fuel demand was 2 per cent greater than estimated and crude runs and the demand for domestic crude petroleum exceeded the forecast by less than 1 per cent.

An 8 per cent increase in domestic crude demand this month over last March is forecast by the Bureau of Mines which warns that last year's reduction of 58,000,000 bbl. of all oil stocks cannot be repeated. This month's motor-fuel demand, estimated at 45,600,000 bbl., is 15 per cent less than a year ago. Bureau's analysis emphasies importance of keeping current production at or above present consumption.

Gasoline Slump Predicted

On the basis of available current data, it now seems probable that total gasoline demand during the first quarter of 1943 may be about 3 per cent less than forecast and the demand for domestic crude petroleum may be from 1 to 2 per cent below the amount estimated. This decline in expected demand can be attributed primarily to the ban on nonessential driving in District 1, effective after the issuance of the forecast for January, to reductions in the value of heating-oil coupons, and to other reductions in consumption of all oils necessitated by the strain on overland transportation facilities.

The demand for domestic crude petroleum in 1943 is dependent on the extent to which the curtailment in civilian motor fuel and fuel-oil consumption is offset by increases in war requirements and exports, on the trend of imports, and on changes in total stocks. Possibly the clearest factor, at the present time, is that the 1942 reduction of over 58,000,000 bbl. in stocks of all oils cannot be repeated. If the total demand for all oils and imports in 1943 should approximate the 1942 levels and there were no withdrawals from total stocks, an increase of about 4 per cent in crude production would be required.

Motor Fuel

Total demand.—The total demand for motor fuel in March is estimated as 45,600,000 bbl., 15 per cent less than the actual demand in March 1942.

Gasoline production.—Direct sales of natural gasoline are estimated at 1,700,000 bbl., making an indicated refinery production of 47,500,000 bbl., distributed among the various refining districts as follows (thousands of barrels): East Coast, Inland Texas, Texas Gulf Coast, Louisiana Gulf Coast, and Inland Louisiana-Arkansas, 20,410; Appalachian, 1,990; Indiana, Illinois, Kentucky, etc., 10,700; Oklahoma, 2,400; Kansas, 2,760; Rocky Mountain, 1,350; California, 7,890.

Crude Petroleum

Runs to stills — Natural gasoline to be blended at refineries is estimated at 4,950,000 bbl. The application of the yield, estimated at 37 per cent, to the straightrun and cracked gasoline production of 42,550,000 bbl. gives total crude runs of 115,000,000 bbl., or 3,790,700 daily.

Exports, fuel and losses.—Crude oil from export and to be used as fuel, and losses, is estimated as 6,400,000 bbl.

WPB Bans Priorities on Several Oil Products

WASHINGTON, D. C.—Use of preference ratings for the purpose of securing certain specified petroleum products was prohibited last week by an order issued by the War Production Board. The regulation, Preference Rating Exclusion Order M-201, was issued, WPB said, to assist the PAW and the OPA in providing an even flow of petroleum products and to avoid conflicts with allocation and rationing programs.

The products for which preference ratings may not be used are: (1) liquefied petroleum gases; (2) aviation gasoline; (3) motor fuel; (4) lubricating oil, including any finished or unfinished, distilled or residual liquid fraction or petroleum used for lubricating, which does not contain in excess of 50 per cent (by weight) of additives or blending compound; (5) fuel oils, including grades Nos. 1 to 6, Bunker C, diesel fuels, kerosene, range oil, gas oil and any other liquid petroleum product used for the same purpose as the above-designated grades; (6) lubricating grease, meaning any lubricant manufactured from petroleum, and a soap, organic salt or ester of any fatty oil or fatty acid; (7) asphalt, including asphalt of petroleum origin and all asphaltic products of petroleum origin, including road oils.

There are two exceptions to the order: (a) Purchase, sale or delivery of fuel oil for use in ocean-going vessels, and (b) regulations or orders hereafter issued by the director general for operations, WPB, specifically assigning the ratings and excepting the transactions from the provisions of Order M-201.

SUMMARY OF FORECASTS FOR MARCH 1943
(Barrels)

	Forecast Mar. 1943	Actual Mar. 1942
Total demand for motor fuel	45,600,000	53,493,000
Supply of Motor Fuel:		
Straightrun and cracked gasoline production	42,550,000	46,238,000
Natural gasoline used at refineries	4,950,000	4,414,000
Total refinery production	47,500,000	50,652,000
Other natural gasoline and imports	1,700,000	1,839,000
Increase in finished stocks	3,600,000	
Decrease in finished stocks		1,002,000
Available supply	45,600,000	53,493,000
Crude-Oil Requirements:		
Per cent yield of gasoline from crude	37.00	41.82
Refinery crude required	115,000,000	110,565,000
Daily average	3,192,900	3,638,000
Domestic crude runs	114,900,000	108,311,000
Exports, fuel and losses	6,400,000	4,466,000
Total demand for domestic crude	121,300,000	112,777,000
Daily average	3,192,900	3,638,000

*The term "Motor Fuel" as used in this report includes gasoline and naphtha used for all purposes, but does not include heavier distillates used in the operation of tractors or burned in diesel engines.

Oil Men Hold Gravity Price Ceilings Will Fail to Stimulate Fuel Supply

WASHINGTON, D. C.—The adoption by the Office of Price Administration of a schedule of fuel-oil prices based on gravity ratings will not, in the opinion of oil men, result in an increased yield of fuel oil and does not solve the problem of compensation for adjustments in refinery yields.

The new plan was put into effect March 3 through Amendment 79 to Revised Price Schedule 88, and OPA announced that "a significant increase in industrial fuel-oil stocks is expected to result."

Oil men, however, point out that the chief result of this new schedule is to permit a refiner to blend light heating oil with residual fuel oil when there are shortages of the latter, and to charge the customer the same price as though he had bought the two grades separately and blended them himself. The new schedule will prevent a repetition of the situation which occurred last spring when there was a shortage of residual fuel oil in the East and of coil-heated tank cars for shipping it. At that time refiners, at the request of the Office of Petroleum Coordinator, mixed lighter cuts with residual but OPA refused to permit collection of prices higher than residual-oil ceilings.

For some time refiners have been seeking a price adjustment which would compensate them for their shifts in yields to produce more fuel oil and less gasoline, and the Petroleum War Council has been advocating adoption of a gravity premium method of pricing, but OPA has not approved such price changes.

Basic Problems Unchanged

The latest OPA amendment may be of some assistance where it is necessary to blend different grades of fuel oils at the refineries, but oil men declare it does not approach the basic problem caused by changed refinery yields.

The regulation issued March 3 includes tables giving dollars per barrel prices for all gravity brackets in all areas where maximum prices are affected. Gravity brackets are fixed to conform to maritime shipping rates.

Formulas and criteria are provided for determining maximum prices for refineries and tanker-terminal operators under regular and exceptional circumstances. Parts of the new amendment follow:

Amendment 79 to RPS 88

(i) Maximum price in the states of Connecticut, Delaware, Florida, east of the Apalachicola River, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, West Virginia and in the District of Columbia, for all residual and residual type fuel oils having a viscosity of 85 seconds Saybolt Universal (at 100° F.) and above, including but not limited to Nos. 5 and 6 fuel oils, Bunker C, Navy Grade, residual diesel fuel oils, residuum gas oil, heavy gas oil, heavy gas enrichment oil, gas house heavy fuel oil, N. E. gas enrichment oil, S. W. gas oil, Ad-

TABLE 1—Maximum Prices in Bulk Lots, F.O.B. Refineries, Seaboard Tanker Terminals, and River Tanker Terminals at Albany, N. Y., and on the Mississippi River Up to and Including Baton Rouge, La. (Exclusive of taxes.)

(Dollars per 42-gal. barrel)

A.P.I. gravity range:	Price area A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
9.9 and below	0.85	0.80	0.74	0.85	1.00	1.43	1.47	1.68	1.68	1.89	2.10	1.85	1.65	1.60	1.50	1.15	1.10	0.95	0.75	0.75	0.80	1.26
10.0-12.9	0.90	0.85	0.85	0.85	1.00	1.43	1.47	1.68	1.68	1.89	2.10	1.85	1.65	1.60	1.50	1.15	1.10	0.95	0.80	0.80	0.85	1.26
13.0-15.9	1.02	0.97	0.97	0.97	1.14	1.51	1.56	1.74	1.77	1.95	2.16	1.97	1.77	1.72	1.62	1.27	1.22	1.15	0.92	0.95	0.96	1.36
16.0-19.9	1.14	1.09	1.09	1.09	1.28	1.59	1.65	1.80	1.86	2.01	2.22	2.09	1.89	1.84	1.74	1.39	1.34	1.35	1.04	1.10	1.07	1.46
20.0-24.9	1.26	1.21	1.21	1.21	1.42	1.67	1.74	1.86	1.95	2.07	2.28	2.21	2.01	1.96	1.86	1.51	1.46	1.55	1.16	1.25	1.18	1.56
25 and above	1.32	1.27	1.27	1.27	1.50	1.71	1.79	1.89	2.00	2.10	2.31	2.27	2.07	2.02	1.92	1.57	1.52	1.65	1.22	1.32	1.24	1.61

A. Comprises Kansas, excluding the area within a radius of 25 miles of Kansas City, Mo.

B. Comprises Oklahoma, Arkansas, Louisiana (excluding Gulf Coast ports and Mississippi River ports up to and including Baton Rouge), Texas (excluding Gulf Coast ports and Panhandle which is defined hereby as the portion of Texas north of the southern boundaries of Parmer Castro, Swisher, Briscoe, Hall and Childress).

C. Comprises New Mexico and Texas Panhandle.

D. Comprises Texas Gulf Coast ports and Louisiana Gulf Coast ports and Mississippi River ports up to and including Baton Rouge.

E. Comprises the area within a radius of 25 miles of Kansas City, Mo.

F. Comprises that part of Missouri within a radius of 25 miles of St. Louis, Mo., and the following counties of Illinois: St. Clair, Madison, Montgomery, Bond, Clinton, Washington, Jefferson, Marion, Fayette, Shelby, Effingham, Clay, Wayne, Hamilton, Christian, White, Edwards, Wabash, Richland, Lawrence, Crawford, Jasper.

G. Comprises the following counties of Kentucky: Union, Henderson, Daviess, Hancock, Brackinridge, Meade, Hardin, Bullitt, Jefferson and Oldham, and the following counties of Indiana: Posey, Vanderburg, Warrick, Spenced, Perry, Crawford, Harrison, Floyd and Clark.

H. Comprises the following counties of Illinois; Lake, Cook, DuPage and Will; the following counties of Indiana: Lake, Porter and LaPorte; the State of Michigan (excluding the counties of Wayne and Monroe).

I. Comprises the area within a radius of 25 miles of Indianapolis, Ind.; the following counties of Ohio: Hamilton, Clermont, Brown, Adams, Scioto, Lawrence, Gallia, Meigs and the following counties of Kentucky: Boone, Kenton, Campbell, Pendleton, Bracken, Mason, Lewis, Greenup and Boyd.

J. Comprises the following counties of Michigan: Wayne and Monroe; the following counties of Ohio: Lucas, Wood, Hancock, Putnam and Allen.

K. Comprises the following counties of Ohio: Lorain, Medina, Cuyahoga, Summit, Stark, Portage, Geauga, Lake, Ashtabula, Trumbull, Mahoning, Columbiana, and the following counties of New York: Chautauqua, Erie, Niagara, Cattaraugus, Allegany, Wyoming, Genesee, Orleans; and the following counties of Pennsylvania: Potter, Cameron, Clearfield, Cambria, Somerset and all other Pennsylvania counties west thereof; West Virginia.

L. Comprises Albany, N. Y.

M. Comprises Portland, Me.; Portsmouth, N. H.; Boston and Fall River, Mass.; Tiverton and Providence, R. I.; New Haven, Conn.; New York Harbor; Philadelphia Harbor; Baltimore, Md.; Norfolk, Va..

N. Comprises Wilmington, N. C.; Charleston, S. C.; Savannah, Ga.; Jacksonville and Miami, Fla.

O. Comprises Tampa, Fla.

P. Comprises Pensacola, Fla.

Q. Comprises Mobile, Ala.

R. Comprises the area within a radius of 25 miles of Denver, Colo.

S. Comprises Wyoming.

T. Comprises the Montana counties of Blaine, Fergus, Golden Valley, Stillwater and Carbon and counties of Montana east thereof.

U. Comprises the Montana counties of Hill, Chouteau, Judith Basin, Wheatland, Sweet Grass, Park and counties of Montana west thereof.

V. Comprises Utah.

TABLE 2—Maximum Prices in Bulk Lots, F.O.B. Refineries in Districts 1, 2, 3 and 4 as Defined by the Petroleum Administrator for War and Not Covered by Table 1

(Dollars per 42-gal. barrel)

A.P.I. gravity:	Price area								
	AA	BB	CC	DD	EE	FF	GG	HH	II
9.9 and below	BP*	BP	BP	BP	BP	BP	BP	BP	BP
10-12.9	BP	BP+0.05	BP	BP	BP	BP+0.05	BP+0.05	BP	BP
13-15.9	BP+0.12	BP+0.17	BP+0.06	BP+0.09	BP+0.20	BP+0.20	BP+0.16	BP+0.10	BP+0.14
16-19.9	BP+0.24	BP+0.29	BP+0.12	BP+0.18	BP+0.40	BP+0.35	BP+0.27	BP+0.20	BP+0.28
20-24.9	BP+0.36	BP+0.41	BP+0.18	BP+0.27	BP+0.60	BP+0.50	BP+0.38	BP+0.30	BP+0.42
25 and above	BP+0.42	BP+0.47	BP+0.21	BP+0.32	BP+0.70	BP+0.57	BP+0.44	BP+0.35	BP+0.50

*BP. Base price which is to be determined as follows: If a refiner has an established maximum price under other provisions of this price schedule for fuel oil meeting No. 6 commercial standard specifications then the base price shall be the refiner's or terminal operator's maximum price thereunder for such No. 6 fuel oil to the class of purchasers who are the principal users of such fuel oil in that price area in which the particular refiner is located.

Base prices established hereunder must be reported by each refiner to the petroleum branch of the Office of Price Administration in Washington, D. C., within 15 days after March 3, 1943, or within 15 days after the initial sales of any grade of fuel oil the maximum price for which is established by this subdivision.

If a seller cannot establish a base price hereunder then he shall file a tentative price with the petroleum branch of the Office of Price Administration in accordance with Section 1340.159(b) (7).

AA. Comprises Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Conneticut, New York (excluding counties of Chautauqua, Erie, Niagara, Cattaraugus, Allegany, Wyoming, Genesee and Orleans). Pennsylvania (excluding counties of Potter, Cameron, Clearfield, Cambria, Somerset and all other Pennsylvania counties west thereof), New Jersey, Maryland, District of Columbia, Delaware, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi Gulf Coast ports, Louisiana Gulf Coast ports, Louisiana Mississippi River ports up to and including Baton Rouge, and Texas Gulf ports.

BB. Comprises Mississippi, excluding Gulf Coast ports), Louisiana (excluding Gulf Coast ports and Mississippi River ports up to and including Baton Rouge), Texas (excluding Gulf Coast ports), Tennessee, Arkansas, New Mexico, Oklahoma, Kansas (excluding the area within a radius of 25 miles of Kansas City, Mo.), Missouri (excluding, the areas within a radius of 25 miles of Kansas City, Mo., and St. Louis, Mo., Iowa, Minnesota, Wisconsin, North Dakota, South Dakota, Nebraska, and Wyoming.

CC. Comprises the following counties of Illinois: Lake, Cook, DuPage and Will; the following counties of Indiana: Lake, Porter, LaPorte; Ohio (excluding the counties of Hamilton, Clermont, Brown, Adams, Scioto, Lawrence, Gallia, Meigs); the following counties of New York: Chautauqua, Erie, Niagara, Cattaraugus, Allegany, Wyoming, Genesee, Orleans; the following counties of Pennsylvania: Potter, Cameron, Clearfield, Cambria, Somerset, and all other counties of Pennsylvania west thereof; West Virginia; and Michigan.

DD. Comprises that part of Missouri within a radius of 25 miles of St. Louis, Mo.; Illinois (excluding the counties of Lake, Cook, DuPage and Will); Indiana (excluding the counties of Lake, Porter and LaPorte); the following counties of Ohio: Hamilton, Clermont, Brown, Adams, Scioto, Lawrence, Gallia, and Meigs; Kentucky.

EE. Comprises Colorado.

FF. Comprises eastern Montana which is defined hereby as the portion of Montana east of the western boundaries of the counties of Blaine, Fargus, Golden Valley, Stillwater and Carbon.

GG. Comprises western Montana which is defined hereby as the portion of Montana west of the eastern boundaries of the counties of Hill, Chouteau, Judith Basin, Wheatland, Sweetgrass and Park; Idaho.

HH. Comprises Utah.

II. Comprises the area within a 25-mile radius of Kansas City, Mo.

miralty fuel oil, Navy Special fuel oil, Mirando and Mirando type crude when sold as No. 5, or other residual fuel oil, or as a heavy gas enrichment oil shall be not more than 30 cents per barrel in excess of the maximum prices that would otherwise govern under Section 1340.159(b) (1) to (3) and (b) (7) except that at the refineries and ocean terminals designated in Table 1 of subdivision (ii) the prices there specified shall be the maximum prices. Sellers who charged the increases in price authorized by Amendments 4, 10 and 27 to Revised Price Schedule 88 on their sales of residual fuel oil as defined in this paragraph during the March 26, 1942, to January 9, 1943, period shall not be deemed to have exceeded their maximum prices because of such additional charges.

(ii) Maximum prices of residual fuel oils and blends thereof with distillate fuel oils, of the A.P.I. gravities indicated in Table 1 and otherwise meeting current commercial standard specifications for fuel oils, except Navy Special fuel oils and all diesel fuel oils.

(b) Maximum delivered prices, in bulk lots, of those refiners and tanker-terminal operators whose f.o.b. maximum prices are established by Tables 1 and 2.

If a refiner or terminal operator has an established maximum price or prices under other provisions of this price schedule at a particular delivery point for fuel oil meeting No. 6 commercial standard specifications, then his maximum price or prices at that point for fuel oil of 9.9 A.P.I. gravity and below shall be his maximum prices thereunder for such No. 6 fuel oil at such delivery point.

If a refiner or terminal operator has no established maximum price or prices at a particular delivery point under other provisions of this price schedule for any grade of fuel oil meeting No. 6 commercial standard specifications, then he shall file a tentative maximum price at such point for fuel oil of 9.9 A.P.I. gravity and below in accordance with Section 1340.159 (b) (7).

Differential to Be Added

For gravities higher than 9.9 A.P.I. such refiner's or terminal operator's maximum price or prices at a particular delivery point shall be the sum of his maximum price for fuel oil of 9.9 A.P.I. gravity and below and the dollars and cents differential between the price for fuel oil of 9.9 A.P.I. gravity and below and such higher gravity fuel oil established under Tables 1 or 2 for refineries or ocean terminals located in the price area where the delivery is made.

(c) Maximum f.o.b. shipping point and delivery point prices for all sellers other than those refiners and tanker-terminal operators covered by inferior subdivisions (a) and (b) above.

If a seller other than a refiner or ocean-terminal operator has an established maximum price or prices under other provisions of this price schedule at a particular shipping or delivery point for fuel oil meeting No. 6 commercial standard specifications, then his maximum price or prices at that point for fuel oil of 9.9 A.P.I. gravity and below shall be his maximum price or prices thereunder for such No. 6 fuel oil at such point.

If a seller has no established maximum price or prices at a particular shipping or delivery point under other provisions of this price schedule for any grade of fuel oil meeting No. 6 commercial standard specifications, then he shall file a tentative maximum price or prices at such point for fuel oil of 9.9 A.P.I. gravity and below in accordance with Section 1340.159(b) (7).

For gravities higher than 9.9 A.P.I. gravity, a seller's maximum price or prices at a particular shipping or delivery point shall be the sum of his maximum price for fuel oil of 9.9 A.P.I. gravity and below and the dollars and cents differential between the price for fuel oil of 9.9 A.P.I. gravity and below and such higher gravity fuel oil established under Tables 1 or 2 for refineries or ocean terminals located in the price area where the delivery is made.

(d) If a refiner, ocean-terminal operator, or other seller had an established maximum price or prices under other provisions of this price schedule at a particular shipping or delivery point for residual fuel oil or blends thereof with distillate fuel oils which either meets No. 5 fuel oil, commercial standard specifications, or has a

lower viscosity than No. 5, his maximum price for such fuel oil at such point shall be either the price or prices which he is permitted to charge under (a), (b) and (c) of this subdivision (ii) or the price or prices established under other provisions of this price schedule, whichever is higher.

(iii) **Diesel oil.**

(a) **Louisiana and Texas Gulf Coast.** The maximum price for residual diesel oil of below 28 A.P.I. gravity ship's bunkers (ex lighterage) on the Louisiana and Texas Gulf Coast shall be $1.35 per barrel.

(iv) **California.** — Maximum prices, exclusive of taxes, f.o.b refineries and tanker terminals for Pacific Standard No. 300 fuel oil having a viscosity of not less than 25 and not more than 60 seconds Saybolt Furol (at 122° F.) and of Pacific Standard No. 400 fuel oil having a viscosity of not less than 60 seconds Saybolt Furol (at 122° F.) when sold to consumers or refineries in bulk lots for delivery by tank car, motor transport or pipe lines shall be as follows:

Area—	No. 300	No. 400
Fresno County	$0.95	$0.85
Kings County	.95	.85
San Luis Obispo County*	.95	.85
Tulare County	.95	.85
Santa Barbara County	.95	.85
Kern County	.95	.85
Ventura County	.95	.85
Los Angeles County	.95	.85
Orange County	.95	.85
Riverside County	.95	.85
San Bernardino County	.95	.85
San Francisco Bay area	1.00	.90

*Maximum f.o.b. refinery and tanker terminal prices at Port San Luis shall be the maximum prices established hereunder at the San Francisco Bay area.

57,000 Tons of Pipe Turned To Domestic Operators

CHICAGO. — Approximately 57,000 tons of tubing, casing and drill pipe of various sizes, produced in 1942 under lend-lease agreement, has been diverted to the domestic industry and is now available to operators under certain conditions specified by the Petroleum Administration for War, the Metal Reserve Corp., and the U. S. Treasury Department.

Details on what materials are available and how operators can qualify for purchase of the equipment were announced here last week by Wirt Franklin, director in charge of PAW District 2.

In a letter to District 2 operators, Mr. Franklin said:

"Purchase orders should be made out by the operator to the Metals Reserve Corp., Washington, D. C., for the material which the operator desires to purchase. Operators in District 2 should send their purchase orders in quadruplicate to L. B. Holland, director of materials for District 2, 624 South Michigan Avenue, Chicago, Ill., for countersignature. However, after countersigning, the material director, instead of returning the purchase order to the operator, will send it in triplicate to the Petroleum Administration for War, Washington, D. C., for attention of D. R. Knowlton, director of production, where it will be examined and acted upon.

"If an operator should choose to secure his material through a supplier, then the supplier must act as purchasing agent in behalf of the operator. In this instance, the supplier should make out the purchase order to the Metals Reserve Corp. direct, and thereafter transaction proceedings are carried on solely between the supplier and the Metals Reserve Corp. The MRC has expressed desire that the supplier make a statement on his purchase order to the effect that the material is not going into stock but is going into immediate use by the following operator, after which the supplier will set forth the full name and address of the operator. In addition to this and for the benefit of the PAW, the supplier should accompany this purchase order with copies of the purchase orders which he in turn has received from the operator, together with a written statement from the operator stating his needs for the material, his inventory status, and complying with such further requirements as are set forth below. When handling a transaction of this nature, the supplier will be governed by Priorities Regulation 204, Revised Price Schedule 49, Section 1306.159 (i) (7) of the Warehouse and Jobbers Section of the Iron and Steel Price Branch of the Office of Price Administration which permits the supplier to add an additional 3 per cent to the price of the material for his efforts in making the transaction.

Requirements

"Any material that is purchased by any operator should not increase his supply of like material beyond a 90-day stock after the material has been received and unloaded.

"In order to relieve mill rolling schedules, operators who are in need of any of this material and who have placed orders for like material with the mills direct, or through suppliers, should cancel the orders against the mills unless such operator substantiates his need for the additional material as described below. Two copies of the cancellation notices should be sent by the operators to the district materials director of PAW from which office one copy of each cancellation notice will be sent to the Materials Division of PAW in Washington.

"In the instance of orders for this material which do not replace cancellation orders against the mills, Section F of P-98b forms should be prepared and attached to the purchase orders. These will be considered with the same care and handled under the same procedure that Section F of P-98b forms would be handled.

"The price for this material will be the established ceiling price for new material of identical specifications, f.o.b. Pittsburgh, Pa., or Lorain, Ohio, plus transportation charges to the operator's destination.

"The Procurement Division of the U. S. Treasury Department will invoice the customers for the material and the purchaser will be required to promptly pay for the oil-country tubular goods."

List of Tubular Goods Available From Lend-Lease

2⅜-in., o.d., 4.7-lb. seamless E.U.E. tubing 8 Rd. Thd., Range No. 1, J-55, 3,500 tons.
2⅞-in., o.d., 6.5-lb. seamless E.U.E. tubing 8 Rd. Thd., Range No. 1, J-55, 9,300 tons.
3½-in., o.d., 9.3-lb. seamless E.U.E. tubing 8 Rd. Thd., Range No. 1, J-55, 2,300 tons.
4½-in., o.d., 12.75-lb. seamless E.U.E. tubing 8 Rd. Thd., Range No. 1, J-55, 3,000 tons.
2⅞-in., o.d., 10-lb. Grade D internal upset drill pipe, 8 Rd. Thd., Range No. 2, 100 tons.
3½-in., o.d., 13.3-lb. Grade D internal upset drill pipe, 8 Rd. Thd., Range No. 2, 200 tons.
4½-in., o.d., 16.6-lb. Grade D internal upset drill pipe, 8 Rd. Thd., Range No. 2, 700 tons.
5 9/16-in., o.d., 22.2-lb. Grade D internal upset drill pipe, 8 Rd. Thd., Range No. 3, 1,300 tons.
6⅝-in., o.d., 25.2-lb. Grade D internal upset drill pipe, 8 Rd. Thd., Range No. 3, 4,300 tons.
6⅝-in., o.d., 31.9-lb. Grade D internal upset drill pipe, 8 Rd. Thd., Range No. 3, 1,300 tons.
5¾-in., o.d., 17-lb. seamless casing, 8 Rd. Thd., Range No. 3, J-55, 700 tons.
5¾-in., o.d., 19.5-lb. seamless casing, 8 Rd. Thd., Range No. 3, J-55, 200 tons.
5¾-in., o.d., 22.5-lb. seamless casing, 8 Rd. Thd., Range No. 3, 100 tons.
6⅝-in., o.d., 20-lb. seamless casing, 8 Rd. Thd., Range No. 3, J-55, 18,000 tons.
6⅝-in., o.d., 24-lb. seamless casing, 8 Rd. Thd., Range No. 3, J-55, 5,000 tons.
6⅝-in., o.d., 26-lb. seamless casing, 8 Rd. Thd., Range No. 3, J-55, 2,000 tons.
6⅝-in., o.d., 28-lb. seamless casing, 8 Rd. Thd., Range No. 3, J-55, 1,200 tons.
10¾-in., o.d., 45.5-lb. seamless casing, 8 Rd. Thd., Range No. 3, J-55, 500 tons.
10¾-in., o.d., 68-lb. seamless casing, 8 Rd. Thd., Range No. 2, J-55, 2,000 tons.
16-in., o.d., 75-lb. seamless casing, 8 V Thd., Range No. 1, J-55, 1,500 tons.

New Catalyst Yields More And Improved Gasoline

NEW YORK.—Development of a new catalyst which will make possible a marked improvement in America's already high quality aviation gasoline was announced Wednesday by Socony-Vacuum Oil Co., Inc. Gasoline made over the new catalyst is said to increase available power output of aircraft engines by from 23 to 35 per cent, depending on character of charging stock. Under comparable conditions yields of aviation gasoline base stock from given crudes can be increased from 13 to 30 per cent.

The new catalyst is a synthetic bead type, so called because it is in form of translucent spherical particles resembling small glass beads. As tested at the Paulsboro, N. J., pilot plant, it has proved extremely rugged with far greater strength and resistance to wear than other catalysts and has demonstrated exceptional catalytic activity with very little loss in service.

Beads average 1/7 in. in diameter compared to pellets 1/6 in. in diameter and 1/6 in. long for Houdry and fine white powder used in the fluid process. The bead will carry an average load of about 200 lb. before crushing and a mass in packed column will carry load equivalent to about 3,000 lb. without breakage. Conventional synthetic catalyst will carry but 30 lb. without crushing and packed in a column will break below 1,000 lb. In laboratory ball-mill test, the new catalyst showed only 1 per cent fines formation in 6 hours against 60 to 90 per cent for conventional catalyst. In jet test, where particles are carried in air stream at 104 ft. per second and impinged on steel plate, bead catalyst showed zero breakage and only 3 per cent wear after passing through 90,000 cycles of this treatment. Conventional catalyst showed 10 per cent breakage after passing through only 270 cycles.

The new catalyst is reported to be very active and, depending on process requirements, can be prepared with equal or better activity than conventional synthetic types. It shows excellent catalytic stability in service, and a minimum of 1 year of commercial service life in T.C.C. units for which it was primarily designed is predicted, varying with charging stock. On a mixed-base charge, the relative increase in yields is 13 per cent; naphthenic base is 25 per cent and paraffinic base is 30 per cent. With the new bead catalyst, Socony-Vacuum asserted, the T.C.C. process attained new levels — substantially above present standards. This is indicated in terms of maximum available power output from supercharged aircraft engines. Three different stocks were treated over other catalysts and over the new T.C.C. catalyst in which the latter showed power output increases of 23 to 35 per cent, depending on charging stock.

Three Recent Basic Improvements

John A. Brown, Socony-Vacuum president, stated: "In oil refining, the improvement in processes and products comes so fast that as soon as the best is commercially available it is apt to be superseded by something better. In the past few months there have been three basic improvements announced in catalytic cracking, of which this company is interested in two: the Houdry process (owned approximately one-third by Socony) and our own T.C.C. (Thermofor Catalytic Cracking) process. At the present time a total of 20 T.C.C. units are under construction, seven by Socony and 13 by six other oil companies. There are 15 Houdry units in operation and 10 under construction in the United States and four in Russia. Both T.C.C. and Houdry units can be easily converted to use of the new bead catalyst which will improve their performance beyond any catalytic operation known to date. From this better fuel, fighter planes will gain a substantial increase either in maximum speeds or rate of climb and the greater lifting power for bombers can mean an increased load of 2 to 3 tons out of every 10 tons carried."

Cost of the new catalyst is less than that of others, more expensive on a weight basis, but because of ruggedness, stability, long service and effectiveness, actual cost is considerably less. The amount of critical material needed for plants to manufacture the new catalyst is small and mostly standardized equipment.

Licenses to use the new catalyst are available to other companies through the Houdry Process Corp.

Canadian Government to Finance Outpost Drilling

CALGARY, Alta. — A systematic policy of aiding in the drilling of outpost wells in Turner Valley is being worked out by the Canadian Government.

Tentative plans contemplate establishment of a fund of $3,000,000 which will be advanced to operators at 3½ per cent to finance outpost drilling. One rig will handle a group of wells. The subsidized operations will be unitized and production will be used to cover the cost of the unit.

No royalties will be paid either government or companies but when sufficient oil has been produced to repay the outlay with interest the wells will be transferred to the companies or individuals concerned. The initial program will cover approximately 15 wells.

DEATHS

George W. Whitehill, 85, died at Clarion, Pa., February 26, following a short illness. He was a driller by occupation, and had lived in Clarion for 25 years. Five sons survive.

Martin Schiff, 52, chief engineer of Century Electric Co., St. Louis, Mo., died suddenly on February 15. Mr. Schiff was a graduate of Cornell University, and served as an officer during the first World War. He joined Century Electric Co. in 1933. His widow, a son and a daughter survive.

James Clinton Beardsley, 89 of Fredonia, N. Y., who conducted oil-well drilling operations in the vicinity of his home town, for more than 40 years, died last week at his home. A daughter and four sons are among the survivors.

Tom Mattison, a partner in the firm of Christianson & Mattison of Maricopa, Calif., died February 21. He drilled his first California oil well in the Sunset field in 1901.

Loren S. McDowell, Sr., 92, pioneer West Texas oil man, rancher and banker, died last week at Big Spring, Tex. His wife and a son survive.

Floyd E. Stevenson, 52, for 28 years connected with the Union Gas Co. of Canada, died at Petrolia, Ont., on February 17.

George Wickenhoefer, 56, for 35 years an employe of Gulf Oil Corp., and agent at Laredo, Tex., for 9 years, died last week. He is survived by his widow and two daughters.

George H. Snyder, 60, oil operator and producer, died last week at his home in Wichita, Kans. He had been ill at a hospital for the past 6 weeks. Mr. Snyder was an independent operator in Mid-Continent fields for more than 30 years. During the past few years he was associated with Victor T. Martin, operating as the firm of Union Oil Co., Inc.

Peter C. Patterson, 73, retired vice president of National Tube Co., died at Pittsburgh, Pa., last week. He had been ill for 10 months.

More Efficient Burning of Refinery Fuels

by Robert Reed *

Admitting that combustion is an art and not a science in the light of our present knowledge of the subject, the author of this article shows the way in which it may become a science by outlining the basis of measuring the efficiency of refinery furnaces. The second part of the paper discusses the handling of burners of different types using different grades and classes of fuels.

LIQUID and gaseous fuels are burned in radically different manners so to avoid confusion, their burning is discussed separately. There are, however, certain points of similarity in oil and gas burners which should be covered at this time.

Refinery fuels are as follows: Gas: (1) Natural gas, (2) Process gas. Liquid: (1) Pitch, (2) slop oils, (3) cracking cycle stocks (gas oil), (4) residuums from cracking and topping, (5) naphthas and gasoline, (6) blends of 4 and 5, (7) sludge.

A burner is nothing more than a device designed to permit air to flow through it into the furnace to provide oxygen for burning the fuel. Satisfactory burning of fuel requires turbulence to mix the fuel stream with the air stream quickly and since there are many schools of thought as to just how the turbulence should be obtained, we have many makes of burners. All gas burners are based on eight basic designs, each of which has characteristics which are typical and the same thing may be said of oil burner design which follows two basic types. The number and size of burners to deliver any given duty is determined chiefly by the amount of draft or subatmospheric pressure existing in the furnace to be fired. Frequently we are asked "what is the maximum capacity of this burner?" We are compelled to ask "at what draft?" Because, for instance, one particular type of burner is good for 10,000,000 B.t.u. per hour when the draft is 0.10-in. w.c. but at 0.5-in. w.c. draft, the burner would deliver more than 21,500,000 B.t.u. per hour. The burner would, therefore, be drilled and designed for the duty according to the available draft.

Before fuel can be burned it must be in the gaseous state so since gas meets this requirement perfectly, a gas burner is simply a device intended to produce a complete and rapid mixture of gas and air. The chemistry of combustion is quite complex and while most authorities accept the hydroxylation theory in which the hydrocarbons are converted to alcohols and aldehydes then into CO_2 and H_2O in a number of steps it is not our intention to offer the theory as being absolutely correct despite considerable evidence in support of it.

*Engineer, John Zink Co. This paper was presented at the Shreveport meeting of the Western Petroleum Refiners Association.

Air Required for Combustion

Hydrocarbon fuels require air for combustion in inverse ratio to their H/C ratio by weight. Natural gas, having a high H/C ratio requires the least air per cubic foot. Refinery gas of say 0.9 specific gravity (air equals 1.0) has an H/C ratio which is much lower and therefore more air per cubic foot of gas is required. This seems to build up into a vicious circle in which the use of heavier fuels requires larger and larger burners but fortunately, as the H/C ratio goes down, the heating value of the gas goes up so that a burner of a given size, provided with a given draft will provide sufficient air for the same heat release with any hydrocarbon fuel. To put it differently, a burner which is capable of delivering 5,000,000 B.t.u. per hour using natural gas for fuel will deliver the same duty when using oil for fuel.

Excess air, or air delivered through the burner in excess of that required to burn the fuel, may be either a very useful tool or a very great hindrance in the operation of furnaces. It is very useful in that it provides a cooling medium for certain parts of the furnace or for all of the furnace; it provides extra volume of flue gas to flow over convection surfaces and increase the amount of heat transferred there; through regulation of the amount of excess air, heat duty may be shifted from the radiant to the convection sections of heaters and back again at the discretion of the operator; flame may be suppressed by excess air and dangerous impingement of flame on heating surfaces may be avoided.

On the other hand, large volumes of excess air may act as a definite hindrance because the larger volume of air, discharged from the stack at high temperature results in tremendous heat loss and lowered efficiency; an increase in the volume of excess air tends to raise the stack temperature further to hinder efficient operation; due to the presence of large quantities of O_2, oxidation of tubes and metal surfaces in the furnace is greatly accelerated; the heat transfer "pattern" is upset and excessive overload may be placed on certain tubes in the furnace.

When a furnace is designed, the designer considers the maximum amount of excess air which may be used and arranges the heating surfaces accordingly. If the greater part of the heat is to be transferred in the radiant portion of the furnace most of the transfer surface is located in the furnace itself and only a small convection or preheater section is provided. With this arrangement he will recommend a low excess air factor which would be from 20 to 30

per cent. The more heat he wants to transfer in the convection the higher the excess air factor he will recommend. In some of the older furnaces flue gas is recirculated over the convection tubes to maintain high transfer rates there.

Heat is transferred by two methods, radiation and convection. Radiant heat does not follow gas currents, must have an unobstructed path between source and the object heated. The amount of radiant heat transferred depends on (1) mass of radiating body; (2) temperature difference; (3) distance between radiant and absorbing bodies. Convected heat transfers by hot gases flowing over heating surfaces, and the transfer rate depends on (1) gas temperature; (2) gas mass velocity and turbulence; (3) efficiency of the "scrubbing" action on the transfer surface. In a furnace, it is almost impossible to determine just how much heat is transferred by radiation and how much by convection because of the flow of gases in the various portions of the furnace. Current nomenclature designates that part of the furnace in which the fuel is burned as the "radiant" section, while convected transfer is presumably obtained in transfer surface which cannot "see" the flames or the combustion chamber proper. This nomenclature is not strictly proper since hot gases very definitely have mass and can, therefore, dissipate their heat content by either radiation or convection or both. Convected heat-transfer data, according to designing engineers, is very largely empirical.

Factors Governing Efficiency

In setting up the amount of radiant transfer to be obtained from any furnace, the designer bases his design on the excess air factor not only because he may control furnace temperatures, etc., with excess air but because the amount of radiant heat to be taken will vary with the CO_2 and H_2O content of the flue gas, richer concentrations of them increasing the amount of radiation and vice versa. Where the excess air is low, we have, of course, lots of CO_2 and H_2O in the flue gas.

The efficiency of a furnace is governed by the excess-air factor, the stack temperature and the air leakage into the furnace at various points. All three of these factors may be controlled by the careful operator. In general, it may be said that the limit on the reduction of excess air is the flame condition existing in the furnace. If the flames are very short and crisp and if the Orsat shows the presence of excessive quantities of air in the flue gas in a sample taken in the furnace proper, not in the duct or the stack, the volume of air for combustion may be reduced. Further reduction may be taken if, along with constant checking with the Orsat to avoid running into a deficiency of air, the flames as produced by the burners remain short and clear.

If reduction of air for combustion produces long flame or flame impingement on any heat-transfer surface, more air must be admitted to shorten the flame and stop the impingement. If this work is being done in the average refinery which is using process gas, the reduction of excess air should be made with the heaviest gas which is to be burned at any time.

In the average refinery, the fuel may vary, in heating value, from 1,400 B.t.u. per cu. ft. to more than 1,800 B.t.u. per cu. ft. in the process gas supply and where such conditions prevail it is obviously necessary to establish minimum excess air while using the higher heating value fuel. Where a furnace is being fired with oil this precaution need not be observed since there is very little difference in the lengths of flames as made by either light or heavy oil when properly burned.

Flue gas analysis with any standard Orsat will enable the operator to determine the percentage of excess air present in any furnace and for this reason, the Orsat is one of the most valuable tools in the maintenance of efficient operation. If the solutions are fresh and proper technique is followed the Orsat will give a true picture of combustion conditions but like all good tools, the Orsat is very capable of giving an erroneous picture when it is asked to do something for which it is not designed.

At best, an Orsat is nothing more than an instrument designed to show the percentage, by volume, of CO_2, O_2 and CO present in flue gas. It will not show the water vapor resulting from the burning of hydrogen and it also has no provision for showing the intermediate products of combustion such as alcohols and aldehydes. We can say truthfully that we have never found CO in a flue gas sample. A number of combustion men say the same thing while others insist they have found minute concentrations of CO at extremely rare intervals but since the concentrations were so minute, it is highly questionable whether their findings were correct or the indication came as a result of faulty Orsat technique.

Samples of flue gas should always be taken directly from the furnace in which the fuel is being burned at a point in the furnace where it is evident that combustion is complete. Samples taken from stack or breeching will almost invariably include air leakage which not only dilutes the sample to make the CO_2 concentration seem low but also adds O_2 to further confuse excess air determination.

Presence of Carbon Monoxide

It is pointed out that indications of the presence of CO are subject to question despite the fact that the furnace may be actually running short of air. Unburned fuel, especially gas and oil will appear either as smoke or free carbon or in the form of aldehydes. The Orsat makes no provision for indicating the concentrations of these products so the operator has only one alternative when he suspects a furnace of being short of air. He should check one sample and, if he is suspicious of the results, admit more air for combustion and again check the flue gas. If the increase in air flow results in a lowered CO_2 reading then it is highly probable that the first reading was essentially correct. If an increase in air delivers a higher CO_2 than the furnace was,

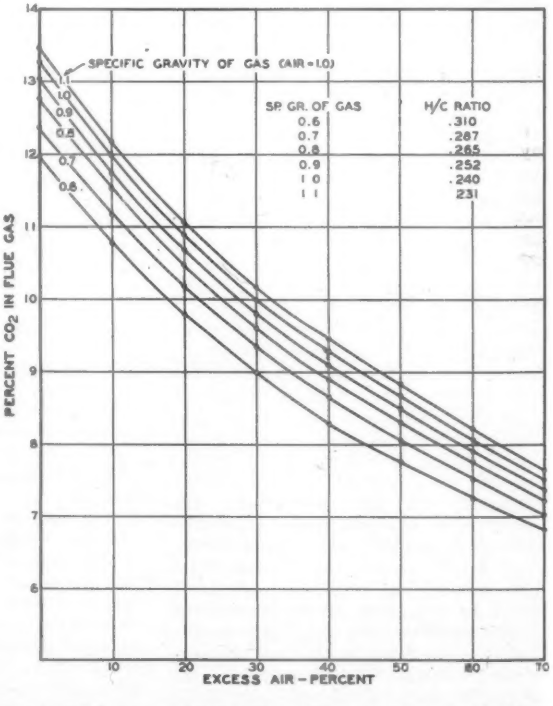


Fig. 1—Excess air curves for C1 to C5 gas mixtures undiluted by free H_2. Curves are based on H/C ratios by weight of the gases for which the curves are plotted. If free H_2 is present, add weight of free H_2 to H_2 of the hydrocarbon to compute a corrected H/C ratio by weight to arrive at true excess air. Reliable only for undiluted flue-gas samples taken from furnace. (John Zink Co.)

in all probability, short of combustion air. No CO_2 reading should be presumed to be correct unless at least three samples have given the same indication with a variation of not more than 0.2 per cent.

Free Hydrogen Confuses Results

When burning process gas in the refinery it is well, especially if some of the gas is residual from catalytic processes, to be on the lookout for free hydrogen in the gas. The hydrogen burns to H_2O which does not show on the Orsat. Therefore, where appreciable quantities of hydrogen are present in the gas a fairly low CO_2 reading may still be indicative of good excess air conditions. If free hydrogen is present in the gas, excess air data may be arrived at from the theoretical ultimate CO_2 of the gas being burned or through the use of charts based on the H/C ratio by weight of the gas. With the chart, (Fig. 1) the weight of the free hydrogen should be added to the hydrogen content of the hydrocarbon fuel and a corrected H/C ratio obtained for reading from the chart.

Some refinery gases run as much as 25 per cent free hydrogen and, as an example, consider a mixture of 75 per cent ethane and 25 per cent hydrogen. The specific gravity of this mixture would be 0.767 (air — 1.0) and its ultimate CO_2 would be 12.38 per cent. If the hydrogen were not present in a hydrocarbon gas of the same specific gravity the ultimate CO_2 would be 12.72 per cent. In a heat balance such a difference would make a very respectable error creep into calculations and it should be guarded against in relatively close work.

While it is difficult for us to make any definite assertion as to just what excess air should be for the best condition, fair averages throughout the country are about as follows: Oil heaters fired with gas, 25 to 40 per cent; oil heaters fired with oil, 40 to 60 per cent; boilers without water walls, when gas-fired, 10 to 20 per cent; when oil fired, 40 to 60 per cent; boilers with water walls to protect the refractory, when gas-fired, 10 to 20 per cent; when oil-fired, 15 to 30 per cent. These figures are to be considered averages and as such may not fit individual conditions.

Maximum transfer rates per square foot of transfer area seem to be determined more on the basis of "how much can we get through without losing tubes," than on any cut-and-dried procedure. We know of oil-heater-transfer rates that exceed 20,000 B.t.u. per sq. ft. in long service without tube failure but it is probable that each heater or boiler is a law unto itself and should be operated in a manner particularly suited to it.

To further disqualify ourselves as experts we will say that as a result of our work with combustion we are firmly convinced that combustion is an art, not a science, and it is usually the man who has the most experience who is able to produce the best results in any furnace. There are at least 100 laws which govern combustion and it is asking too much of anyone to expect him to provide a proper answer for all of them since the conditions he must meet are subject to so much variation without notice. As an example of this we cite an instance in our experience where burners were designed and delivered to burn 800 B.t.u. gas but when the fuel arrived at the burners it was a standard 1,750 B.t.u. refinery gas. There was a veritable round-robin of "who's to blame" but in the end experience prevailed and the burners were made to perform satisfactorily.

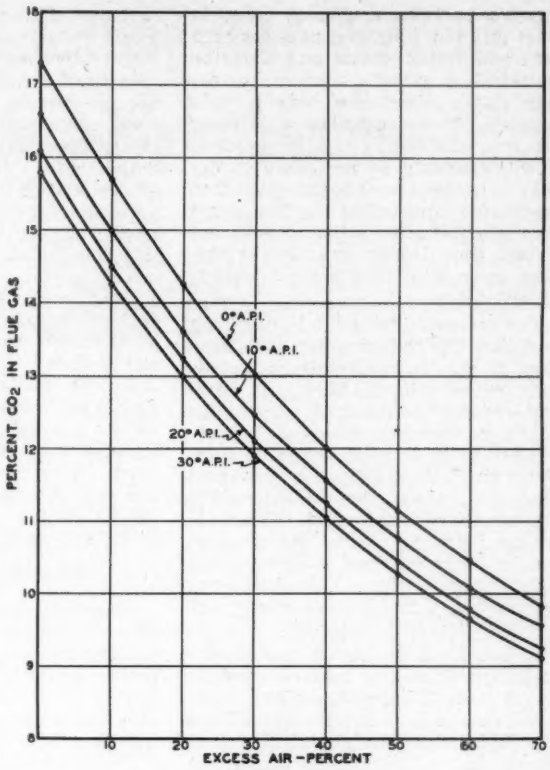


Fig. 2—Excess air curves for the burning of oils from 0° A.P.I. to 30° A.P.I. Reliable only for undiluted flue-gas samples taken from furnace at a point where combustion is complete. (Courtesy John Zink Co.)

Specific Problems in Fuel Burning

To deal with fuels and burners specifically, suppose we first think about oil burners and oil as fuel. The "ideal fuel oil" is either a topped residuum or a cracked residuum or a blend of the two ranging in A.P.I. gravity from 8 to 20 and delivered to the burners at a temperature sufficient to maintain a viscosity of 250 seconds Saybolt Universal. This temperature may probably be in the range between 150° and 200° F. according to the fuel, with heavier fuels requiring higher temperatures. This is, of course, to provide fuel for steam atomization. Pressure atomization requires different conditions.

At this time, in refineries, there are almost no pressure or "mechanical" oil burners in use and steam atomization is used instead. There are essentially two types of oil burners and the distinction between them lies in the manner of getting steam and oil together for atomization. The two types are known as the "inside mix" and the "outside mix" steam atomizing oil burners. In the former, the steam and oil come together inside the body of the burner while in the latter mixture occurs outside body of the burner. Inside-mix burners are more satisfactory for refinery service because they use much less steam for atomization and because the shape of the flame from the burner may be regulated to suit any particular furnace proportions or conditions.

In general, it may be said that an inside-mix burner works by first foaming the oil under pressure inside the burner body and then discharging the foam through either drilled ports or through a slot according to the flame shape produced. The foam, upon emerging into the furnace atmosphere bursts at once into millions of tiny droplets which are converted to a vapor by the heat of the flame and can, therefore, burn very readily.

Bunker C grade fuels are excellent for burning because they foam easily and the foam as made is quite stable. The lighter the fuel is the more difficulty that may be expected in burning because as the A.P.I. gravity goes up the foam condition becomes worse. Gas oils are very hard to burn satisfactorily. Fuel oil-naphtha and gasoline blends may be burned with fair satisfaction and in many places low-octane number naphthas are being burned without any mixture with heavier oil.

If it is necessary to burn very light oil, blends or for that matter naphtha, changes must be made in oil-burner design to take care of the change in the foaming characteristics of the fuel. Higher pressure must be maintained in the burner body to get

satisfactory burning and in order to meet this condition it is necessary for both atomization steam and oil to be delivered at suitable pressure to assure flow against the higher body pressure. If the fuel-oil supply pressure ran say 40 lb. with heavy fuel, it will probably be necessary to deliver a naphtha or a light gas oil to the burner at say 125 lb. The steam pressure, for atomization should not be less than 150 lb. and if it is possible there should be some superheat on the steam.

The pressure inside the burner may be raised by reducing the discharge area in the tip until suitable conditions are obtained. This will probably require the purchase of new tips which the manufacturer can furnish. Since the tip apertures will be relatively small, it is always a very good idea to deliver the oil through a strainer the mesh of which is markedly less than the size of the ports in the tip. The strainer is particularly recommended where light fuel is to be pumped through lines which formerly delivered heavier oil.

Steam for atomization should, invariably, be as dry as it is possible to get it. Nothing quite so handicaps an oil burner as does wet steam. Lines should be well insulated and a trap should be installed as close to the burner steam header as it is possible to get it. It is even wise to have a bleed valve in the header to drain condensate continuously so that it will not get into the burners.

Oil burner troubles and their probable causes are:

Sparky fire: (1) Wet steam; (2) suspended matter in the oil; (3) improper tip design for the duty being handled by the burner; (4) foreign matter inside the burner or in the tip apertures.

Long smoky fire: (1) Improper tip design; (2) shortage of air for combustion; (3) not enough steam for atomization.

Failure of ignition: (1) Improper tip design for the duty being handled; (2) too low an included angle on the flame which is also tip design; (3) too much steam for atomization; (4) failure of fuel supply pressure; (5) firing valve stoppage; (6) wet steam or slugs of condensate from the steam lines.

Evidence of Excess Air

Where oil burner flames are dazzlingly white it is probable that too much excess air is being allowed to enter the furnace and where oil-burner flames are fluttery it is probable that too much steam is being used. Properly operated oil burner makes a flame which is yellow-white, perfectly steady and quite fluffy. Puffing in the furnace may be caused either by poor tip design, tip stoppage or shortage of air which all adds up to poor mixture of air and fuel or at least an insufficient mixture thereof.

We are frequently asked about automatic control for oil burners and here again we have a difficult question to answer. Within certain limits partial automatic control may be obtained but we do not know of a single case where wide ranges of heat duties are being handled satisfactorily with automatic oil-firing control. We do not say that such installations do not exist but we do say that we do not know of them.

Where oil firing is controlled remotely by loading and unloading an air-controlled valve and where the oil burners operate in conjunction with constantly burning gas pilots to assure maintenance of ignition on the oil burners a modulation range of about 10 per cent may be taken without great risk but a greater range of modulation would require individual burner adjustment by the fireman.

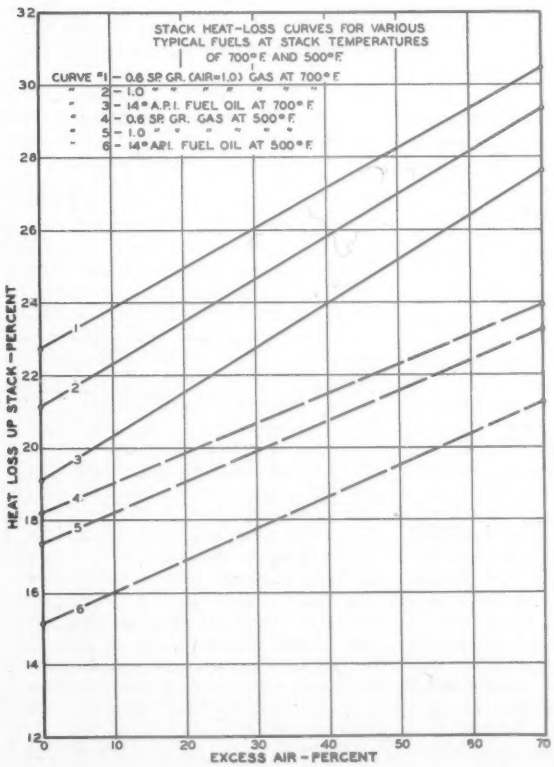


Fig. 3—Approximate heat loss to be expected in burning various typical fuels at the indicated stack temperatures. Reduction of excess air results in lower stack temperatures. Heat losses as indicated include both the sensible heat content of the flue gas and latent heat loss due to burning of hydrogen. (John Zink Co.)

Burning of Sludges

The burning of sludges is a problem usually given a very wide berth by burner men and we certainly are no exception to this rule. Some success has been obtained through the use of very small cooling tower spray nozzles to which the sludge is delivered at high pressure. The whirling action produced by the spray nozzles in combination with high pressure of delivery breaks the sludge up into a fine spray which burns very well. Steam atomizing sludge burners do not last well because the water of the steam combined with the acid of the sludge produces a highly corrosive condition which will, at times, completely destroy a burner in a matter of hours.

Slop oils may be burned in much the same manner as the lighter oils and the use of a strainer is recommended very highly for the removal of foreign matter.

In the burning of lighter oils and naphthas particular attention should be paid to the condition of the fuel lines and valves for, with these fuels, leaks may be very dangerous and should be guarded against. If normal precautions are observed operation will be completely safe.

Oil burning requires much closer firing control than is necessary with gas since automatic control is either impossible or very difficult to obtain. The fireman can no longer take his ease throughout his shift and for this reason it is logical to expect some personnel problems in shifting from gas to a liquid fuel. Despite all the handicaps to be met and overcome in the matter of control and personnel problems many heaters and boilers are being fired very satisfactorily and very efficiently with oil and it is logical to presume that such conditions may be transferred to any plant.

Gas Burner Designs

Gas burner designs number in the hundreds and time and space will not permit us to deal with each of them. We shall say rather we know of only eight basic gas-burner designs each of which has characteristics of operation which are completely typical. In accounting for all the versions of each of the basic designs we can say only that burner men must have salient features in their particular version of any design in order to have "convincers" to offer in sales talks. Most gas-burner design is based on different means of obtaining turbulence of mixture with quickest mixtures pro-

ducing the shortest flames for any given duty. However, the fuel delivery means may be either one of two types which are: Premix, in which a portion of the air for combustion is drawn into a mixing tube by the gas and mixed therewith before being discharged into the combustion zone for burning; nonpremix, in which raw gas is discharged directly into the combustion zone.

In the premix type of burner very short flame is expected normally for reasonable heat duties up to a maximum of 15,000,000 B.t.u. per hour but it is by no means to be concluded the nonpremix burners are not capable of producing short flame. If the heat duty per burner is to exceed 15,000,000 B.t.u. per hour common practice is to use a nonpremix type of burner. Any type of gas may be burned with either fuel delivery means with some exceptions.

If the gas to be burned is very dirty or very wet or if the H_2S content is high, a premix type will serve best because usually the gas is discharged from a single large orifice which is located at some distance from the combustion zone. This orifice will remain clear and unobstructed by coke, gum or corrosion for long periods where with a nonpremix type much trouble with orifice plugging is normally to be expected. Plugging orifices result in decreased heat availability which may cause serious process hindrance if not a shut down.

Efficiency at High Pressure

In burning gas we have found that if a burner can be operated at high gas pressure, which is to be taken as 25 lb. per sq. in., regardless of the types of gas being burned a short flame and high efficiency may be expected almost regardless of burner design. This is particularly true of premix gas burners but is also true of nonpremix burners. In the latter because of the smaller orifices which must be used to limit the flow of gas into the combustion zone, still greater trouble with orifice plugging is almost sure to occur. It is necessary to choose a happy medium between improved combustion conditions and time out to clean burner orifices. This last is not true of a premix burner.

We would, in fact, go so far as to say that if you are now operating burners with say 60 lb. gas pressure and have more pressure available much improvement in operation may be obtained by redrilling the gas limiting orifices of the burners to operate at higher pressure. A change from an operating pressure of 6 lb. to an operating pressure of 25 lb. will produce very marked improvement. You might ask your burner man how to go about redrilling your burner for higher pressure if you are not completely sure of the correct procedure or orifice sizes to use.

Correct Setting May Prevent Surface-Pipe Troubles

TROUBLES with surface pipe in wells drilled by the rotary method are common enough to be more than a minor annoyance; danger of such difficulties warrant taking all the necessary precautions to prevent their occurrence.

Generally the major trouble is the backing, or breaking, off of the lower portion of the pipe after which it either falls down the hole or falls over so that the drill pipe cannot be run or pulled from the hole. A recent example of this did not cause any great difficulty although each time a trip was made, it was necessary to work the bit by the section which fell down the hole. Members of the crew disagreed as to whether part of the pipe had fallen down the hole or not but when an electric log was run prior to completion, the condition was definitely established.

The accompanying drawing shows the conditions in the well as shown by the electric log and it indicates the utility of this tool in determining the situation whenever it is feared that the surface pipe has parted. The log also shows that the method of setting casing on a hard formation, which is the practice followed by the older drillers, has considerable justification.

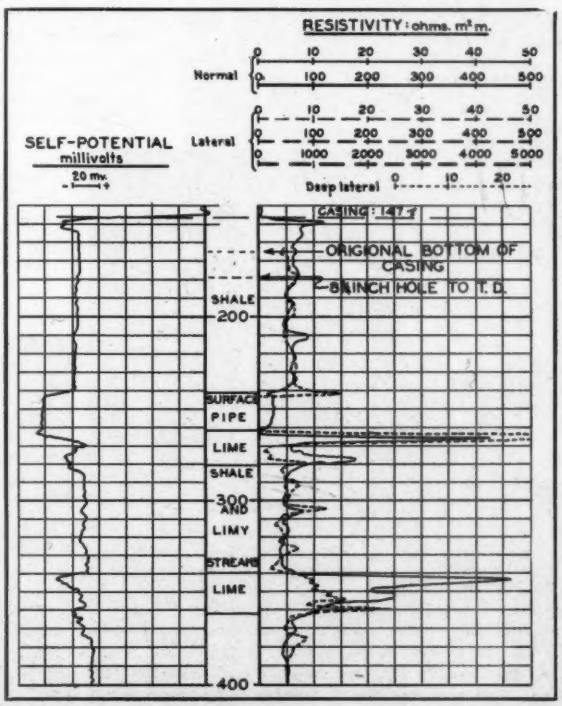
In this case 178 ft. of 8¾-in. hole was drilled through surface shales and clays and the bit was still in shale when pulled from the hole. This hole was then reamed to 13¾ in. and an attempt made to run the 10¾-in. surface pipe but the pipe failed to go to bottom. The hole was then reamed to 168 ft. with a 17½-in. bit and the pipe run and cemented with 170 sacks. The pipe was screwed together in the regular manner and welded to prevent its backing off.

Drilling of 100 ft. more of shale would have placed the hole in the lime formation which stopped the bottom joint from falling down the hole after it had broken loose. Location of this lime streak was not known and consequently the pipe was set in the shale and all the usual precautions taken to prevent damage to the surface pipe. These include the use of rubber protectors on the drill pipe, keeping the drill pipe and kelly used inside the casing straight, and using reduced circulation while drilling out from under surface pipe.

In spite of these precautions, the shale in which the pipe was set caved badly the 8¾-in. hole from 178 ft. to 262 ft. being enlarged so the 10¾-in. pipe (11.37 o.d. coupling) could fall rather freely. What caused the bottom joint to drop off is not known.

Fortunately, the repair of a surface pipe break is no longer difficult providing the drill pipe can be pulled from the hole. Repair can be accomplished by using a modified cement retainer, setting the slips inside the dropped section, picking up the fallen section to its original position and cementing it in place. This procedure was described in detail in an article, "New Type Multiple Completion Technique Developed in Illinois," The Oil and Gas Journal, August 6, 1942.

In many cases the fallen section of pipe will not give any trouble or the trouble will be so slight that it will not be blamed on the surface pipe and well completed without repairs.



Improved Practices Employed at Gas-Line Compressor Station

by Paul Reed

By analyzing operating features it has been possible to devise advantageous changes departing from standard practices for starting certain types of large compressor units, for circulation of lubricating oil and for maintenance operations of a station on a major natural-gas system.

FOR increasing efficiency of operation and for saving time of engineers, a number of practices have been developed by the staff of the Trees compressor station of Arkansas Louisiana Gas Co. at Emmet, Ark. The station is equipped with four 450-hp. Snow and three 500-hp. Cooper-Bessemer units handling a load of from 20,000,000 to 70,000,000 cu. ft. daily with suction pressures as high as 200 lb. Because of its location near Highway 67, the station attracts much attention from men in the industry traveling between Texarkana and Little Rock, Ark., by the appearance of equipment and buildings and the effective manner in which it is lighted at night. In fact, it is probably one of the most conspicuous compressor stations in the country.

Among the improvements at the station are methods for reducing time and effort for starting large compressor units, facilities for making the lubrication system more effective, and equipment for reducing time required for routine operation and maintenance in such a manner that they may be performed safely and efficiently.

A simple device has been made by the chief engineer for saving time and effort in starting the 500-hp. Cooper-Bessemer compressor units, which are of the single, tandem, double-acting, horizontal type. Operators of such units have probably often wished that they could roll the engine over for spotting merely by pushing down on the air-starting device to open the air valve. Resistance, due to the 200 to 250 lb. air pressure holding the air-starting device against the lay shaft, makes it impracticable to try to do this by muscular effort alone. With a simple contrivance, called the special lever device, the air valve can be easily opened by the operator in any position of the engine. In other words, he can use a procedure for starting a single, tandem, double-acting, horizontal unit which is much the same as the one commonly employed in starting a twin, tandem, double-acting unit.

For starting 500-hp. units of the type at the Trees station, the usual practice followed at most stations is to have two men bar the 13-ft. flywheel over until the engine is "spotted." Time and effort consumed in this operation can be eliminated by rolling the engine around by opening the air valve manually.

Starting Method

To describe the method for doing this, the operation of the air-starting device, with which the unit is equipped should be reviewed. After opening the valve in the air line to the engine, air pressure of 200 to 250 lb. per sq. in. pushes the rod at the upper end of the air-starting device upward and holds it snugly against the lay shaft; in this operation the engine's air valve is closed until the cam on the lay shaft rolls around and engages the rod which acts through a bell crank and opens the engine's air valve. When this valve opens the pressure air passes through a spring-loaded check valve into the cylinder. This occurs during the power stroke when both the inlet and exhaust valves are closed. As soon as ignition takes place, the air throttle valve is shut off and trapped air leaks away around the stem of the air valve, allowing this valve and the bell crank to drop down so that the end of the rod of the air-starting device clears the cam and the entire mechanism is disengaged. The cam is adjustable on the lay shaft for timing.

The new practice at Trees station means that the function of the cam is performed by an operator using a special lever device consisting of a $\frac{5}{8}$-in. L-shaped steel rod. For a distance of 10 in. the long leg is straight; the upper end is bent in a gooseneck curve at the end of which the short leg, 2 in. long, branches at a right angle; near the tip of the short leg a hole provides for insertion of a cotter key which holds the special lever device in place in an opening near the top of the air-starting device.

Special lever device for manually opening air valve of compressor designed to have valve opened by cam on lay shaft

The operator pushes the rod of the air-starting device downward by pulling upward the 10-in. leg of the special lever device, the gooseneck curve of which is pressed against the lay shaft of the engine, serving as a fulcrum. As soon as the engine starts, the air-starting device becomes disengaged in the manner previously described, causing its rod to drop. The illustration shows the special lever device inserted in the top of the rod of the air-starting device at a time when the unit was shut down and the air-starting device was disengaged.

Air as well as time is saved by rolling around an engine by this procedure.

Overhead Tank

An improvement has been effected in the operation of compressor units by a change in the lubrication system serving the three 500-hp. units. The four 450-hp. units are served by a separate system. To get away from interruptions to operation, due to occasional faulty lubrication, a different type of overhead tank was installed. Formerly, when the overhead tank was of a horizontal type, settlings would accumulate in the bottom, some of which would occasionally flow in slugs into the lubricating oil going to the engines. To some extent such trouble is the result of the difficulty of keeping a horizontal tank clean, due to the awkward manner in which such cleaning operations must usually be performed.

A long, narrow, vertical overhead lubricating oil tank with a cone bottom was substituted for the horizontal tank on the system discussed. The vertical tank is about 18 by 1½ ft. About 2 ft. from the top is the inlet line; less than 4 ft. from the bottom of the cone is the outlet line; at the very bottom of the cone is a drain line for removing accumulations of settlings periodically. A steam coil in the lower part, below the outlet line, is used only in cold weather when the oil at the bottom is highly viscous. A float gage on the side of the tank, showing the height of the oil, can be easily read at any part of the engine room. A lid is bolted to the top of the vertical tank. This vertical lubricating-oil tank has been satisfactory from the start.

At the shop of the station a board on the wall shows the status of all valves of lines in the vicinity of the plant. Black lines on the board indicate gas lines; lines drawn with aluminum paint represent water lines. Small T-shaped indicators, placed in holes at points corresponding to valve locations, are turned parallel with the line when the valve is open; when the valve is closed the crossbar of the T is crosswise to the line.

A hydraulic press has been built by the company to facilitate overhauling operations. This has proved to be particularly valuable in removing valve bushings.

Pop valves on the suction header blowoff are so placed that, when they pop, gas is directed downward into the pit around the connections. This is a safety measure. The blowoff is equipped with two valves in order to completely prevent leaks.

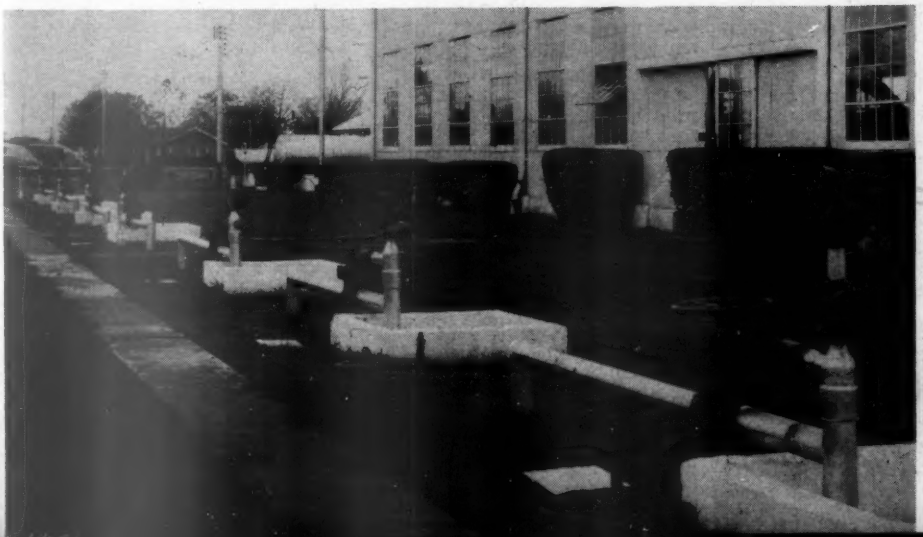
Poles for wires in the station yard are made of reclaimed pipe, nipped in at the top and welded so that they exclude rain.

Outside the office door, atmospheric temperature readings are taken from a thermometer mounted on a wooden block inserted in pipe stuck in the ground. The thermometer is placed at sufficient distance from the building so that there is ample circulation of air around it.

Water for the plant is flowed by gas from wells in the station yard to standpipes which serve as separators; water from the standpipes flows into small tanks from which it gravities to the line to the pump which moves it to the water tower supplying the station and the houses of the station community.

The plant superintendent has carried on experiments with well-flowing methods applicable to oil wells. In connection with this he holds patents on a timing device for a displacement system.

Efficiency and safety are promoted by continual effort to improvement which is fostered by the management of the company. Close attention and analysis, manifested in the creation of new methods, are valuable for taking care of the many routine items which contribute to attaining high standards of operation.



Above: A vertical cone-bottomed tank equipped with steam coil for use in cold weather has improved operation of a lubricating-oil circulation system

Left: Pop valves on the suction header blowoff are installed so that when they pop, escaping gas is directed downward. Poles for wires in the station yard are made of reclaimed pipe

Practical Refining Series—Part 5

STEAM CONSUMPTION OF RECIPROCAL PUMPS

by W. L. Nelson

In determining the steam consumption of reciprocal pumps the following statement will serve as the basis for a working formula:

1,000 lb. of steam per hour at 125 lb. gage pressure will pump 100 gal. of liquid per minute at a pressure of 100 lb. per sq. in.

THE steam required to pump 100 g.p.m. of a liquid at a pressure of 100 lb. per sq. in. gage pressure using 125 lb. (gage) steam is approximately 1,000 lb. per hour.

This constant is based on the fact that the volume displaced from the liquid cylinder of a pump is the same as the volume of steam required to fill the steam cylinder if the steam pressure is the same as the liquid discharge pressure—and corrected of course for the inefficiency of the pump. The steam quantity can be easily converted to pounds by means of its density or specific volume.

Need of Steam Consumption Information

The steam consumption of reciprocating steam pumps is often an important part of the total steam consumption of a refinery. Estimates of pump steam are exceedingly important in formulating plans for new plants or projected operations without resorting to complete process designs. So-called water rates on steam pumps (pounds per I.H.P. hour at rated load) are available from most pump manufacturers for their pumps but such figures are most approximate and they are different for each speed at which the pump operates. In short, most plant operators or engineers have no simple means of estimating the steam consumption of pumps; only those engineers who have had a wide experience in installing pumps are able to accurately estimate steam consumptions.

Examples

In using the constant (1,000) and statement that 100 g.p.m of oil at 100 lb. per sq. in. can be pumped with 1,000 lb. per hour of 125-lb. steam, it is necessary to correct for the amount pumped (if different than 100 g.p.m.) and to correct for the discharge pressure (if different than 100 lb. per sq. in gage). To a large extent these corrections can be made by mental arithmetic computations and considering the estimate nature of such computations, no greater accuracy is really justified.

1. A pump discharges 30 g.p.m. at 250 lb. per sq. in. gage pressure (suction pressure is atmospheric) with 125 lb. (gage) steam. The approximate consumption is 0.3 × 2½ × 1,000, or 750 lb. per hour. Or stated on paper,

$$\frac{30}{100} \times \frac{250}{100} \times 1{,}000 = 750$$

2. 550 g.p.m. of water is circulated in a pressure system at a suction pressure of 50 lb. and at a discharge pressure of 80 lb. The approximate steam consumption is 5½ × 1,000 × 0.3, or 1,650 lb. per hour.

$$\frac{550}{100} \times 1{,}000 \times \frac{(80—50)}{100} = 1{,}650$$

It is also useful to note that 100 g.p.m. is equivalent to 143 bbl. per hour, or to 3,430 bbl. per day.

Should the steam pressure be different than 125 lb. per sq. in. gage), a correction can also be applied by multiplying by the inverse ratio of the steam pressure, i.e., by the new absolute steam pressure divided by 140 (125+14.7), or by the inverse ratio of the specific volume of the steam (from steam tables) if extremely high pressure steam is being used.

3. 7,000 bbl. per day is being pumped at 50 lb. pressure with 150 lb. (gage) steam. The consumption is half of 1,000 × 2 (7,000 bbl. per day is about 200 g.p.m.) × the ratio of 140 over 165 (about 0.9) or about 900 lb. per hour of steam, or more exactly,

$$\frac{50}{100} \times 1{,}000 \times \frac{7{,}000}{3{,}430} \times \frac{140}{165} = 865$$

Basis of Statement

On a basis of 100 g.p.m. pumped at a pressure of 100 lb. higher than the suction pressure, the volume of liquid discharged per hour is

$$\text{Cu. ft./hr.} = \frac{100 \times 60}{7.48}$$

The 125 lb. (gage) steam required at 100 per cent efficiency is

$$\text{Lb./hr.} = \frac{100 \times 60}{7.48} \times \frac{1}{3.23} \times \frac{100}{125}$$

The 3.23 in this equation is the specific volume of 125 lb. (gage) steam. It is also assumed that the steam is discharged from the pump at atmospheric pressure.

Efficiency of Steam Pumps

The efficiency (mechanical, hydraulic and volumetric) of steam pumps does not average more than about 50 per cent, and in addition the loss of steam by venting and condensation reduces the efficiency to even 20-25 per cent.

$$\text{Lb./hr.} = \frac{100 \times 60}{7.48} \times \frac{1}{3.23} \times \frac{100}{125} \times \frac{1}{0.198} = 1{,}000$$

The efficiency of 50.0 per cent is somewhat low but inasmuch as a large amount of steam is lost by condensation and by venting of the steam cylinders, it is thought to be satisfactory for most refinery pumps. The efficiency of steam pumps is cussed in the February 11 issue of The Oil and Gas Journal under the title, "Estimating the Power Required for Pumps."

In case it is useful to develop a particular formula or constant for a special case, the general equation is:

$$\frac{60\,G}{7.48\,S} \times \frac{(P—p)}{(P_s—p_s)} \times \frac{1}{0.4\,E} = 8.03 \frac{G}{SE} \left(\frac{P—p}{P_s—p_s}\right)$$

in which:

- G Gal. per min. of liquid pumped
- S Specific volume of steam
- E Over-all efficiency of pump
- P Discharge pressure (liquid), lb. per sq. in.
- p Suction pressure (liquid), lb. per sq. in.
- P_s Live steam pressure, lb. per sq. in.
- p_s Exhaust pressure from pump, lb. per sq. in.

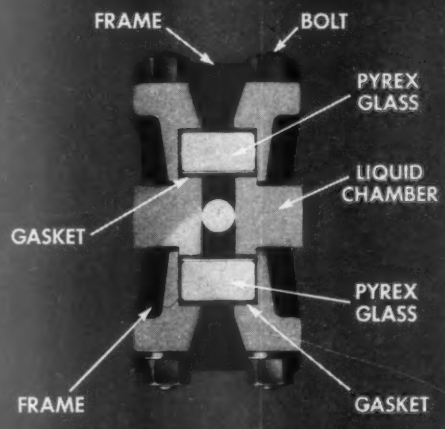
PENBERTHY

DROP FORGED STEEL

TRANSPARENT

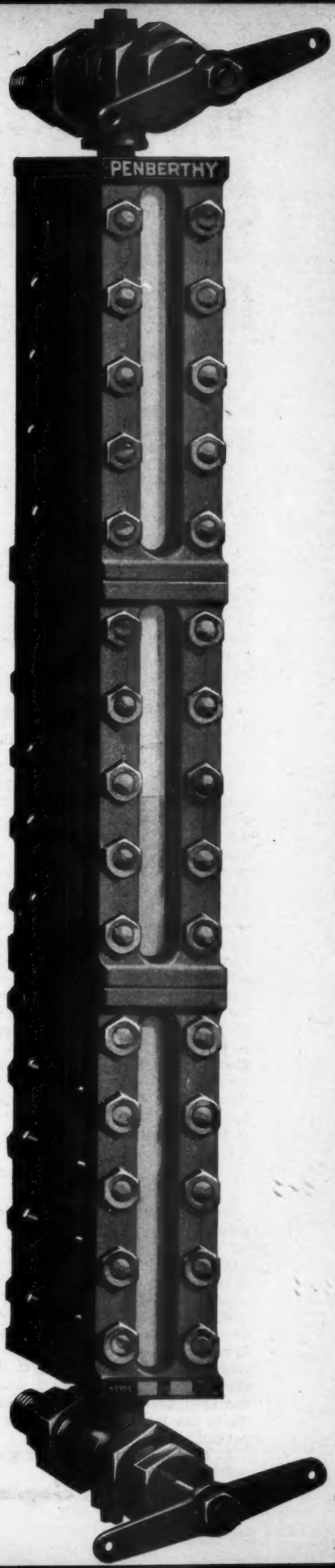
LIQUID LEVEL GAGES

To observe the color or density of liquids under high pressures and/or temperatures



Made of alloy temperature resisting steel. Liquid chamber for single or multiple section gage is made of a solid block of steel the full width of frame to assure perfect alignment and rigidity. Frame has an extra heavy beam at each end and glass chamber is accurately machined to the contour of the glass providing full metal backing for the gaskets. Pyrex glass has greater resistance to thermal shock and erosion.

These gages are available in any length and for various pressures and temperatures. We shall be glad to quote upon your requirements. Write for new Catalog 34-A.



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PENBERTHY PRODUCTS

CANADIAN PLANT:
WINDSOR, ONTARIO

PAW Suggestions for Operators

Tapered Drill Collars

TAPERED drill collars are more expensive than standard collars, but the necked-down tapered type collars are ideally adapted to preventing the highly localized stresses that lead to twistoffs.

Some operators still cling to several stands of drill collars, but the majority of operators and contractors now seem convinced that 60 to 90 ft. of heavy drill collars is sufficient for normal uses. Fast rotary speeds have proved a much greater factor in keeping holes straight than long lengths of drill collars.

Since use of 60 to 90-ft. drilling stands does not require the drill-pipe elevators to be switched for others, they are becoming increasingly popular with field men. The most popular drilling stand in general use today in deeper wells is two 30-ft., 6⅝-in. drill collars (7¾-in. o.d.) subbed to a joint of 4½-in. drill pipe. If short subs (called "twistoff specials") are used there is constant danger of the 4½-in. pipe twisting in two just above the first tool-joint pin. Many operators have special tapered subs (about 5 or 6-ft. long) made to prevent this action and they are very helpful.

Sufficient drill stand weight should be available so that all of the drill pipe may be kept in tension and that portion of the drill collar weight applied that the driller feels necessary.

A very efficient 90-ft. tapered drill stand can be made of the following three 30-ft. drill collars:

Bottom collar—(tapered but necked down).
- Has 6⅝-in. A.P.I. regular box down (7¾-in. o.d.) and 5 1/16-in. A.P.I. regular box up (6¾-in. o.d.).

Middle collar—(tapered but necked down).
- Has 5 1/16-in. A.P.I. regular pin down (6¾-in. o.d.).
- Has 4½-in. drill-pipe thread box up (5¾-in. to 6¼-in. o.d.).

Top collar—(tapered but necked down).
- Has 4½-in. drill-pipe thread pin down (5¾-in. to 6¼-in. o.d.).
- Has 4½-in. drill-pipe thread box up (5¾-in. to 6¼-in. o.d.).

This type of tapered stand has many advantages and the weight and stresses are distributed in the best possible balanced fashion. If the top 4½-in. collar is rendered unusable, the drill pipe will make up into the top of the tapered middle collar without subbing.

At deep depths many operators discard 6⅝-in. collars and switch to 5 1/16-in. because they are much easier to wash over if they become lost in the hole. This advantage is already present in the tapered string described because the bottom collar may be discarded, the top two being used in the deeper drilling. Since there are no standard 5 1/16-in. bit pins or boxes manufactured, the 5 1/16-in pin must be subbed to either a 4½-in. or 6⅝-in. A.P.I. regular box or pin, which also must be done with any ordinary 5 1/16-in. drill collar connection.

If the top-heavy 4½-in. drill collar is to be used alone, it will be necessary to sub its drill-pipe pin bottom thread to a 4½-n. A.P.I. regular box or pin to accommodate standard bits. A sub must be provided if this is to be done but such occasions are usually predictable, and the many advantages of having a drill-pipe thread pin down on this collar more than compensates for the cost of such a sub. Remember the middle collar has a drill-pipe box up, and the lower two collars can thus be used without subbing.

Double-pin and double-box subs are to be avoided between collars but they are necessary for bit connection. In cases where there is an even choice between a box and pin connection on collars, the box should be selected as the threads are better protected.

Welded Collars on Tubing

IN order to secure a flat lower surface for the weld head on collars of reconditioned tubing which would exert no outward force tending to spread open the tubing elevators once weight is applied, the following procedure has been used, materially adding to the safety of running or pulling this type of tubing. The top bearing surface of an old set of tubing elevators was built up with copper and machined to give a flat surface corresponding to the original bearing surface of the elevator. After the tubing collar has been welded in the conventional manner, this elevator or fixture is then installed on the tubing, leaving a small space between the bead and top of the fixture. With the device in place (two set screws are provided for securance) the small space between the bead and top of the fixture was filled in with welding material. The copper surface of the fixture will not adhere to the welding material so that when the fixture is removed the bead has a flat surface and will bear on a set of tubing elevators in the same manner as the original tubing collar.

In this particular instance, the old set of tubing elevators were on hand and were used to construct the welding fixture. However, any kind of clamp or device may be used for this purpose. It should be made so as to be easily and quickly installed, and removed from the tubing, and, of course, must have a copper or other facing that will not adhere to the welding material. The filling in material must be installed by arc-welding equipment as the acetylene method would melt the copper surface of the fixture.

These operating ideas have been extracted from "Suggestions for Oil Producers During the War," Issue No. 2, published by the Production Division, Petroleum Administration for War.

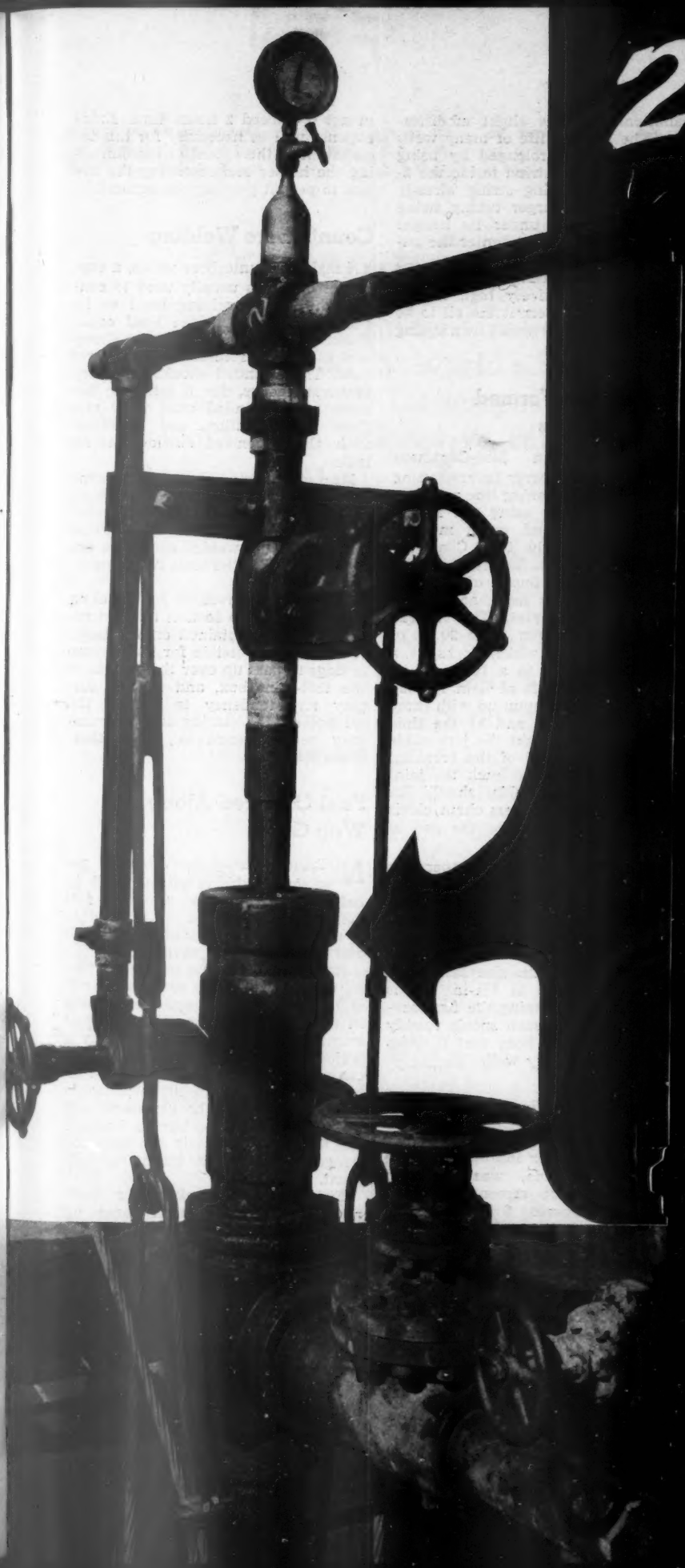
Drilling-Line Usage And Care

AT the present time there exists a large supply of drilling line (wire rope) in factory, field and jobber stocks throughout the country. An attempt is being made by all agencies concerned to encourage operators to use these idle stocks by shopping around for their needs. Wire rope is obtainable on presentation of A-2 preference rating if it has been in stock more than 90 days and is being fabricated in necessary instances on A-1-a rating.

Operators and contractors are making determined efforts to save wire rope consumption and a definite trend toward longer lines is distinguishable. With a long line the drum end can be pulled through and cut off, thus displacing the most-punished section at intervals and permitting a more effective use of the intermediate sections of the line.

Changing the line's position on the drum not only changes the wearing positions on the drum but some axial rotation takes place throughout the length of the line. The shift in "wear points" in different courses between the sheaves also lengthens the life of the line.

With 136-ft. derricks, it is just possible to string 10 lines with an 1,850-ft. line, this length giving about half



2 Heads in 1

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You use Larkin's Type SR 4500-pound-test Tubing Head as a stripper blow-out preventer or oil saver when running or pulling tubing under pressure. Then, with or without the oil resisting NEOPRENE stripper, it serves safely for the flowing life of the well. Removal of the stripper converts it to Type R, a dependable pumping head.

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a complete wrap on the drum. It is not good practice to buy a line of this length because if any wear or damage results there is no spare line to enable some to be discarded and 10 lines cannot then be strung. Lines that are at least 2,200 ft. and preferably 2,500 ft. in length should be purchased for 136-ft. derricks when 10 lines are to be strung.

The line should be pulled through and cut off in lengths from 15 to 50 ft. as it becomes worn. When several hundred feet of line has been discarded, the ends should be "swapped" and the process continued on the other end. Proper care of the drilling line will yield as much as 75 per cent more wear in many instances, but constant, intelligent inspection of strand condition is necessary to obtain best results.

Regrinding and Refacing Balls and Seats

MORE emphasis should be given to the importance of reclaiming alloy parts by facing and grinding worn seats and balls for additional use. Many balls can be reground to a point where they are only 0.015 in. undersize and be nearly as perfect as when originally manufactured. The seat can be refaced in a lathe, then the balls and seats "lapped in" with grinding compound.

This is being done by several of the manufacturing companies and a few operating companies have also set up to do this special job.

It has been reported that seats have been refaced four or five times. Balls offer a problem slightly more difficult, but considerable success has been achieved in regrinding them to a specified size and testing them in the same manner as they do the new ones.

Macaroni Tubing Strings

MANY operators are making initial completions with 1 and 1¼-in. tubing strings at the present time. Others are retubing inside larger tubing in order to take advantage of the velocity effect of smaller tubing.

In areas where the allowable is greatly restricted, it is difficult to "keep alive" many low-pressure oil wells, to say nothing of high water-ratio wells. Rather than flow the well "hard" for a short time and reduce the bottom-hole pressure excessively, operators obviously should prefer to obtain the well's production during a longer period of time.

With large size tubing, it is difficult to lift the water that is produced with the oil and the effective energy of the expanding gas is less than with macaroni tubing.

Many of these macaroni strings can be converted later into gas-lift installations by only slight modification. The flowing life of many wells may be greatly prolonged by using a small macaroni string inside the 2-in. or 2½-in. tubing string already installed. If the larger tubing string is perforated just under its hanger in order to allow gas to enter the annular space between the two tubing strings from the casing, several automatic valves relatively high in the small string will permit the oil to be gas-lifted using the well's own casing gas.

Combination Formed Spinning Lines

OPERATORS in Mid-Continent areas who formerly favored using rope for both a spinning line and tong jerk line are now using the forked spinning chain and cable makeup lines popular on the Gulf Coast for a number of years. This type of device uses about a fourth of the rope that separate lines need, and is not only faster, but safer. The cathead end is made of from 16 to 20 ft. of 1¼-in. sisal rope which forks at a swivel connection to a 16-ft., ¼-in. chain and about 13 ft. of ¾-in. left-lay cable. The pipe is spun up with three wraps of the chain and by the time the pipe is chain tight the jerk cable attached to the end of the breakout tong is in position to buck the joint tight. The jerk cable should be equipped with a harness chain clevis for rapid attachment to the end of the breakout tong.

For many years some operators have used ⅞-in. or 1-in. casing spinning lines because they are so readily flexed and handled. Casing spinning lines are subjected to such friction that small lines are quickly burnt up. Ropes of 1⅛-in. size last much longer. Sisal rope in 1⅛-in. size is a little stiff in running the first several joints but it soon spools readily and has sufficient body that it slides up over collars very well.

Insulation of Fire Box

THE fire box of a 30-in. diameter crude-oil heater located in Osage County, Oklahoma, was insulated with a refractory cement. This job consisted of pouring 6 in. of the cement in the bottom of the fire box allowing, by the use of forms, air and gas inlet through the four bottom holes in the box into the center where an 8-in. opening connects the four inlets below the burner. The walls of the fire box were insulated with from 2 to 3¼ in. of the cement. Two and one-fourth 100-lb. sacks of the material costing $3.80 per sack were used in this job. Total cost of material was $12.35. About 4 man-hours time were required. On regular schedule this job should be done in not to exceed 2 hours time. Extra expense will be necessary for this installation to the extent of disconnecting the heater and removing the fire box to permit pouring the cement.

Counterbore Welding

IN making counterbore welds, a copper clamp is usually used to confine the heavy welding bead to its proper position. As the bead cools, it tends to draw away from the clamp and a slightly rounded shoulder results. This rounded shoulder is very disadvantageous, for it tends to become more rounded with wear and fluid jetting action, and interferes with the action of outside cutting tools.

Most outside cutting tools (and some overshots) are operated by springs on dogs that catch underneath the shoulder of tool-joint boxes, and in many cases the welded shoulders are so rounded that the tools fail to operate.

This may be avoided by beveling the copper clamp so that a slight reverse bevel is obtained on the bead. It is not then possible for the springs or dogs to pass up over the bottom of the tool-joint box, and if they display any tendency to do so, the springs on the cutting tool overshot may be sharpened to insure their operation.

Fuel Oil Fired Along With Gas

NOT infrequently, low-pressure gas in some fields is not available in sufficient quantity to maintain full boiler steam pressure. It is possible to use limited volumes of gas with oil and accomplish fuel savings.

Rather than attempt to fire the fuel oil and gas from the same burner it is best to use two separate burners in each boiler. A common T-shaped burner may be shop-fabricated by a welder and used to fire the gas in conjunction with a steam-atomized oil burner. It is not usually practicable to attempt to mix the gas steam and oil through the same burner, because the low-pressure gas is generally too irregular to permit steady adjustment.

Firing from the back with a ducknest designed to roll both flames up against the front inside wall of the fire box seems to give the most efficient results. The gas burner is always wide open, the fuel-oil feed being varied as the load varies to maintain full head of steam.

The expense of oil firing has steadily increased because of increased oil transportation and labor costs. In some sections of the country an actual shortage of prime boiler fuel oil exists at times, and crude oil must be used even though for such purposes it is not nearly as satisfactory.

Cooperating with Uncle Sam

Four independent refiners joined together in 1931 to build the world's first cooperative Dubbs-cracking unit Its purpose was to crack the oils from their respective refineries to the best advantage of all Universal designed it It was enlarged in 1939

Now those refiners have taken a fifth party into their cooperative set-up—Uncle Sam He wants 100-octane gasoline—and lots of it

To make constituents of 100-octane gasoline the refiners are spending more than a million dollars converting the unit to catalytic cracking Universal refining specialists are on that job, too

Says Oil and Gas Journal:

> When conversion work is completed the cooperative cracking unit will supply charging stock to a government-owned plant now being constructed on adjoining property for the manufacture of 100-octane gasoline

That's the kind of cooperation going on throughout the refining industry today

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Stream...

Type G-MV — built for gas or diesel fuel

4, 6, 8 or 10 power cylinders

400 to 1,000 horsepower

Pressures up to 6,000 p.s.i.

Wherever gases must be handled, compressed or processed.

If your equipment must stay on stream for prolonged periods, then you'll want C-E compressors.

Cooper-Bessemer has always designed and built for steady dependable operation . . . week in, week out . . . for months at a stretch. Hundreds of veteran compressors, driven by Cooper-Bessemer gas engines, are still in service today, after twenty, thirty, or more years of satisfactory performance.

More and more, men in the oil refining, natural gas and process industries who know compressors are buying Type G-MV. This "last word" in compressors, with a compact V-angle engine, is ruggedly built, efficient in performance, economical to operate. It incorporates the sound principles learned in a century of engine building, with modern design features needed to meet the industry's compressor problems of today — and tomorrow, too.

Helping in the production of fuels and lubricants for Allied Victory are these four Type G-MV-6, V-angle compressors in Shell Petroleum's new Cromwell, Texas, plant.

by **Cooper-Bessemer**

MOUNT VERNON, OHIO AND GROVE CITY, PENNA.

Houston, Dallas, Greggton, Pampa and Odessa, Texas Tulsa Shreveport St. Louis Los Angeles Seattle, Wash.

PLANT PRACTICES

Stripper for Instrument Gas From Scrap

IT IS important that the gas or air used to operate instruments in gasoline plants and refineries be as dry and clean as possible. For this reason, filters or mist extractors usually are installed on the gas or air line to the instruments. Various types have been used, but an unusually effective unit has been designed and built by the operator of a Kansas gasoline plant using scrap materials. In this plant gas is being used for the instruments. This is taken off small side outlets from the absorber residue gas line. The main body of the stripper consists of a section of 4-in. pipe about 10-ft. long, with both ends closed except for two 1-in. outlets, one in the top for the gas outlet and the other in the bottom for the fluid drain. The unit is set vertically, about 2 ft. in the ground, adjacent to the residue gas line from which the gas is taken. Two 1-in. lines connect the residue gas line and the stripper, feeding the gas into the side of the stripper at two points, one above the other. The two feed lines are equipped with small gate valves so that either or both lines can be used. A 1-in. line leaves overhead to the instruments carrying the stripped gas. The accumulated condensate in the bottom is drawn off through a 1-in. drain line to the sump. Screening on the interior of the chamber facilitates extraction of any mist that might be carried in the gas.

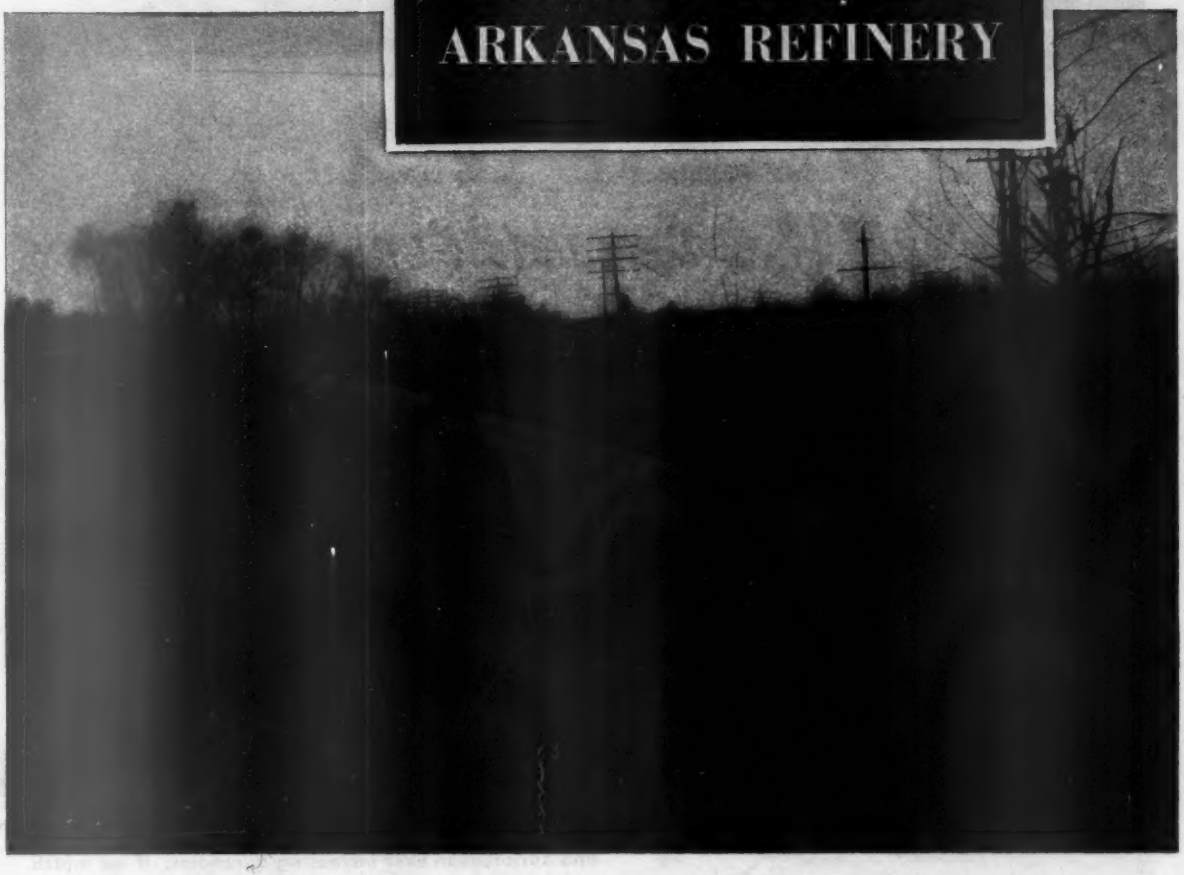
Wheel-Mounted Work Bench

THE work bench in this compressor plant is mounted on wheels so that it can be moved wherever there is any work to be done, saving the operator much time and effort in carrying parts and tools. The bench is approximately 7 ft. long and 3 ft. wide, and is equipped with drawers, shelves and racks for various tools and small parts. It also carries a permanently installed vise and other necessary repair equipment. The frame and legs are constructed of piping, the top being sheet metal. The wheels are on roller bearings for easy movement, and are equipped with hard-rubber tires. In one end, shown in the picture, there has been fastened a tin container, into which greasy rags are dropped.

Flood-Light Gin Poles Built From Well Casing

FLOOD-LIGHT gin poles in a large Kansas refinery are being made from old oil well casing due to the difficulty of obtaining new equipment and materials regularly built for that purpose. Each of the poles consists of four joints of casing welded together, totaling from 90 to 95 ft. For the lower two joints, 16-in. and 12-in. casing is used, with the upper portion of the poles being 10-in. The lights are mounted on a circular support fabricated from 2-in. pipe and welded to the top of the pole. Connections are provided for eight lights around the rim of the support.

A CAST IRON water line installed by an ARKANSAS REFINERY



Of *course* it's cast iron pipe, which will outlast the refinery and then present the choice of re-use or salvaging as scrap. But the service of cast iron pipe to the petroleum industry is versatile. Standard cast iron pipe is indicated for cooling and condensing coils, rundown lines, discharge lines, salt water disposal and other applications. Inherently and effectively resistant to corrosion. Low in ultimate cost. Alloy cast iron pipe for super-corrosive conditions is also available. Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Building, Chicago, Ill.

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Victory.. Demands Superior Weapons

...AND AMERICA'S MASTER CRAFTSMEN ARE PRODUCING THEM.

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America's superior weapons in the hands of the finest and best conditioned specimens of manhood on earth—American fighters—will hasten victory. There must be no let-up. We must keep these weapons going to our boys and our allies in ever increasing quantities. If we match the sacrifices of our front line fighters, victory is certain.

REED ROLLER BIT CO.

HOUSTON, TEXAS, U. S. A.

Drilling mud is watched closely on the deep Ellenburger wells in the Embar pool, Andrews County, Texas. Here O. W. McKeehan, derrick man on one of Phillips Petroleum Co.'s rigs runs a test in a filter press. The results? A water loss of 10 cc. and a filter cake of about 3/64 in. at 30 minutes under 100 lb. pressure

Troubles From Salt Sections, Hard Formations, Impede Embar Drilling

by Harry F. Simons

Wells drilled to the different pays in the Embar fields, Andrews County, Texas, impose different problems because of the special casing program used for each pay. This article deals with the solutions employed in dealing with mud problems and drilling difficulties encountered.

MUD treatment required by a salt section in the Permian formations, tool-joint failures, and cherty formations just above the Ellenburger pay horizon are the principal difficulties encountered in drilling wells in the Embar pool of southern Andrews County, Texas. This field is one of the major West Texas discoveries of the last year, has two good producing horizons and one not so good in addition to the usual gas-bearing formation in the Yates.

The pay zones being exploited are the Ellenburger dolomite in the Ordovician (7,900 to 8,000 ft.) and the Tubb section in the Clear Fork lime of the Permian at about 6,300 ft. The San Andres pay in the Permian at 4,300 to 4,400 ft., from which most West Texas fields obtain production, has some oil but it is of secondary importance and will probably be best exploited when the other zones are depleted or a more favorable price situation obtains. There is considerable development of the San Andres in the West Andrews pool to the northwest and in the Mascho and Emma pools to the east.

The structure is reported to be a truncated anticline and consequently the wells in the producing area penetrate practically identical sections. On the flanks, it drops quite rapidly and the pay formations are considerably deeper and do not produce oil. The Ellenburger production is being developed on 80-acre spacing with the wells being located on 40-acre spots on long 80-acre plats. This will permit later development on 40-acre spacing. There are no field rules on the Tubb development.

At the present time there are eight Ellenburger wells in the pool, three Tubb (Clear Fork) wells, one San Andres well, six wells drilling to the Ellenburger and the Tubb and locations or surface pipe for three more.

The Ellenburger and Tubb producing areas are approximately ½ mile apart. Ellenburger production to date is centered in Section 30, Block 10, of University Lands and extends into Section 31, Block 10, with one well each in the adjoining corners of Sections 25 and 26, Block 11. Tubb production is along the west side of Sections 20, 29 and 32, Block 10.

Amount of Overlapping Unknown

How much overlapping there is in the two pools is not known. The Tubb discovery was plugged back from the Ellenburger and another Ellenburger dry hole is located ½ mile east in the NW NE of Section 32, Block 10.

The section encountered in drilling in Embar is shown in a Journalog of the discovery well published in The Oil and Gas Journal, June 18, 1942. It consists of shales and sandy shales to the top of the Rustler anhydrite at about 1,320 ft. and shale and anhydrite to about 1,860 ft. where the salt is encountered. The main salt section is about 600 ft. thick. Anhydrite, lime, shale and some sand with salt stringers extend to about 3,550 ft. Below 3,550 there is mostly shale with some sand, lime and anhydrite just above the top of white lime at 3,760 ft. From that point to total depth, drilling is in lime and dolomite with some of the lime quite sandy. Chert sections occur in the dolomite below 7,450 ft.

Strangely enough, the wells drilled to the Tubb (Clear Fork) pay at about 6,300 ft. are inclined to give more trouble than those drilled to the deeper Ellenburger. The reason for this is the attempt to save as much pipe as possible with the result that a considerable section in the Permian containing salt and other minerals is not cased off. Practice in the field has been to set the 12¼-in (i.d.) surface pipe to around 210 ft. to 300 ft. with a spudding machine although some of the rotary rigs have set their

own pipe. An 11-in. hole is then drilled to the point where the intermediate string of 8⅝-in. casing is set although in a few cases a tapered hole has been drilled. In such cases the first bit under the surface pipe is a 12-in. bit and the second an 11-in. bit.

Intermediate String

In the Tubb zone wells, the intermediate string is set at about 3,000 ft. whereas in the Ellenburger wells the intermediate string of pipe is set at about 3,500 ft. Wells with 3,500 ft. of intermediate pipe can use a fresh-water mud from there to 8,000 ft., while those with pipe above this point must use a salt-water mud or an organic-colloid mud for drilling the hole below the intermediate casing point.

Serious difficulty may arise from the use of a mud not having the desired water-loss and filter-cake characteristics. Practically all of the cases of stuck pipe, and they have been quite numerous, have been traced to this one cause. Organic-colloid mud has been used very successfully for coring and drilling the pay, the objective being a low water-loss fluid (10 or 20 cc. in 30 minutes) which will prevent harm to the formation. The difficulty of preventing this mud from souring precludes its use over an extended period in spite of its good water-loss and filter-cake characteristics.

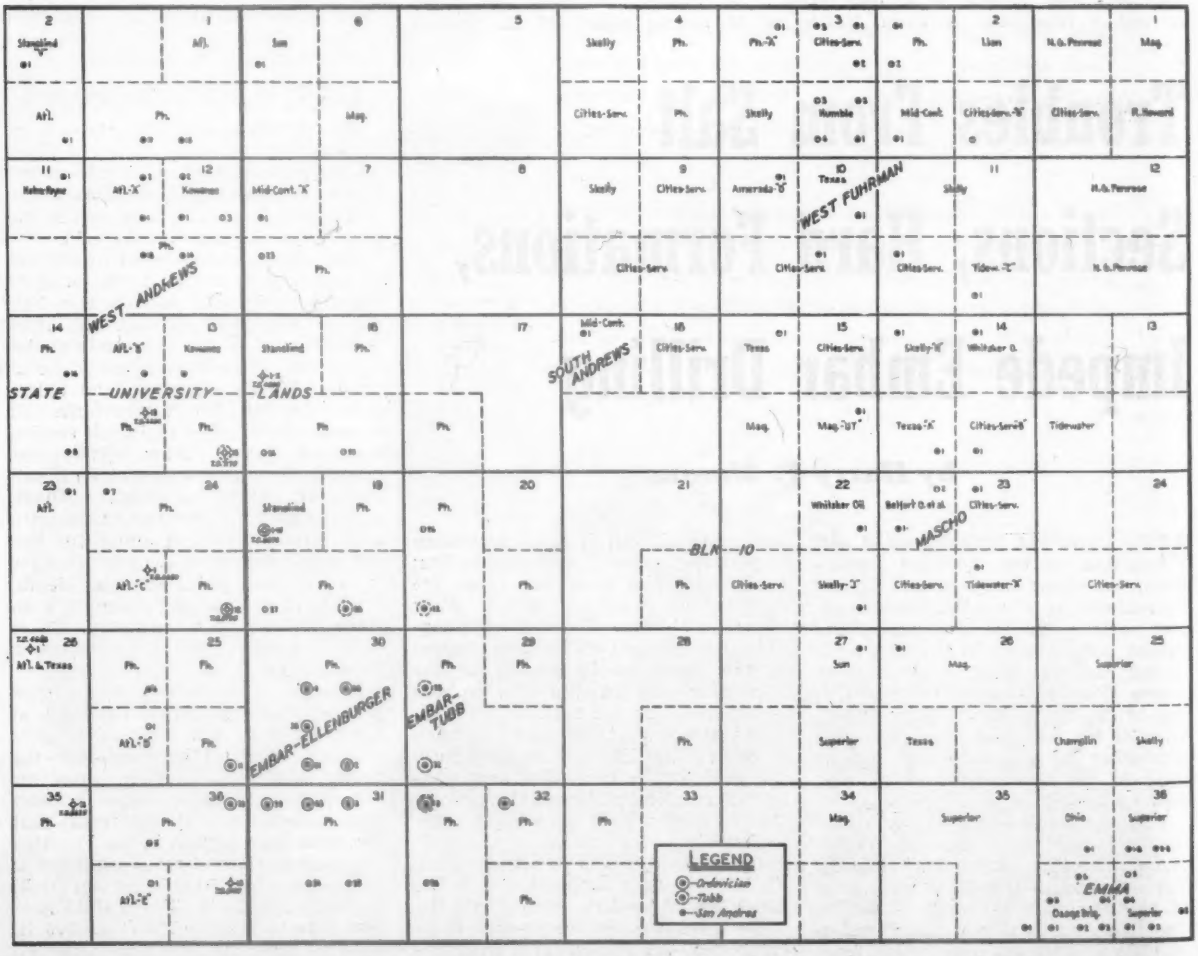
Some strings of pipe have been freed by spotting acid or oil while others have not been so fortunate. For instance, one well currently active set 3,010 ft. of 8⅝-in. intermediate casing and had reached 4,713 ft. with a 7⅞-in. hole when trouble developed. When 57 ft. off bottom near the conclusion of a trip, the bit began to take weight instead of falling freely. The driller started to lay down a joint preparatory to reaming and found the drill stem stuck. The drill stem was made up of 3½-in. drill pipe and 140 ft. of 6-in. drill collars.

Spotting oil four times failed to produce any results and the pipe was worked in two at 3,055 ft. The top of the fish could be caught with an overshot but a washover string would not get over it. The drill pipe was then shot off at 4,551 ft. but it still could not be pulled due to cuttings settling around the lower portion of the drill stem. An attempt was made to jar loose and a set of rotary jars, 130 ft. of 6-in. drill collar and a knuckle joint were run in the hole. Unfortunately, the top of the fish could not be contacted as it was kicked over in the washed-out hole. The hole is being sidetracked.

If all of the salt section is not cased off, the salt-water mud used consists mainly of native clay and material which will increase the viscosity slightly. Such a fluid will show a high water loss (50 to 80 cc. in 30 minutes) and a correspondingly thick filter cake. This mud allows the salt to go into solution which forms cavities in the upper part of the hole and permits the shales to be continuously wetted with consequent sloughing.

Drill-Pipe Troubles

Another difficulty which arises from the formation contents going into solution with the water in the mud is the failure of the drill pipe. There are a number of sulfur compounds involved and undoubtedly some hydrogen sulfide. The drill-pipe



Embar pool on the University Lands in Andrews County, Texas, showing location of Ellenburger, Tubb and San Andres development.

failures exhibit many of the characteristics of hydrogen sulfide embrittlement.

One well drilled to the Ellenburger which set the intermediate string at 3,200 ft. had 22 twistoffs on a fairly new string of pipe. Practically all of the failures were identical, i.e., breaks in the thickest section of the tool joint adjacent to the pipe threads. This is shown in an accompanying illustration. The breaks are rather clean and are circumferential without any evidence of cavitation. Inspection of a string of pipe while pulling out of the hole is practically valueless as there are no preliminary indications of a break.

One indication of embrittlement, or hardening, of pipe exposed to mud contaminated by the salt section is the difficulty of making the pipe tongs operate. The keys in the tongs are not hard enough to "bite" on the tool joints showing that there is a loss of malleability and toughness. Extra-hard tong keys operate satisfactorily only a short time.

Mud Treatments

While there are several hard streaks above 6,400 ft., they do not compare with the cherty sections found below 7,400 ft. which must be penetrated by the Ellenburger wells. The wells to the Tubb pay can be drilled much quicker and consequently the drill pipe is not subjected to the embrittling conditions for a long enough period to cause trouble. The saving of the 500 ft. of 8⅝-in. casing is an important item at present.

Tubb wells in which a salt-water mud is used are drilled to just above the pay section and then the drilling fluid changed to an organic-colloid type. This brings the water loss down to 10 or 12 cc. and permits coring without danger of damaging the formation; it also lessens the danger of sticking and other troubles. No trouble has been encountered in preventing fermentation of the material for the few days' time required for coring and running of casing.

It should also be pointed out that when the organic-colloid material was first tried in the field, it was not well understood. Later work with the material has developed methods of preventing fermentation (principally maintenance of a high pH) and one contractor was preparing to use it in a well currently drilling in the Embar pool. If it is successful, the drilling of future wells will be much simplified and considerable steel will be saved.

Ellenburger wells protected by 3,500 ft. of intermediate casing use a fresh-water and Aquagel mud with a viscosity (A.P.I.) of 32 to 34 seconds and a weight of 9 to 9.5 lb. per gal. Water loss is from 10 to 12 cc. at 100 lb. pressure and 30 minutes time, and the filter cake is from 1/32 to 2/32. Such a mud keeps the hole in excellent condition, no trouble is had with caving or sticking of pipe and in case of fishing jobs trips can be made without difficulty.

This mud is maintained by the addition of some water to help dilute the solids and then Aquagel to take up the excess water. The viscosity is controlled by the addition of caustic quebracho. A normal day's mud material includes 10 to 12 sacks of Aquagel, 200 lb. of quebracho and 40 lb. of caustic soda. Water is never added unless Aquagel is also used.

Due to the nature of the soil, special care must be taken in erecting the pits. A mud system incorporating standard practice as well as some improvements was described in the February 25 issue of The Oil and Gas Journal.

Ellenburger wells in the pool are drilled with approximately 80 bits although some wells have gone considerably over this number due to encountering extremely hard chert sections. Tubb wells can be drilled with 40 to 45 bits.

One of the Ellenburger wells used twenty-four 7⅞ bits to cut 35 ft., an average of less than 1.5 ft. per bit. Another required 30 bits for 38 ft. in the section 7,833 to 7,871 ft. Bits lasted only 1 or 2 hours and made anywhere from 0 to 5 ft. Seven bits with a total running time of 16½ hours produced 1 ft. of hole.

Typical tool-joint failure on a string of pipe used in a well in the Embar pool where the complete salt section was not cased off. Break is almost as clean as though it had been cut with a hacksaw. Sulfide embrittlement is believed to be the cause

Tubb wells setting 3,000 ft. of pipe require five to eight 11-in. bits and 30 to 35 bits of the 7⅞-in. size. Ellenburger wells require from 7 to 10 of the 11-in. bits to drill the hole for setting the 3,550 ft. (more or less) of surface pipe and from 65 to 110 of the 7⅞-in. bits for drilling the lower portion of the hole. Tubb wells use five or six coreheads to cut the pay section while Ellenburger wells use 10 or 12 coreheads in the two pays.

From 3,000 ft. to between 3,800-50 ft., footage per bit will average from 80 to 100 ft. From 3,850 to about 4,200 ft. the average cutting rate is about 5 ft. per hour and the footage per bit runs from 45 to 50 ft. A hard streak at about 5,000 ft. may slow drilling to 1 or 2 ft. per hour and about 20 ft. per bit, but this is less than 100 ft. in thickness. From 7,450 ft. on to the total depth, cherty streaks in the dolomite may be encountered. Progress ranges from 0 to 5 ft. per hour and from 0 to 80 ft. per bit until the pay section is encountered.

Size of Drill Pipe Used

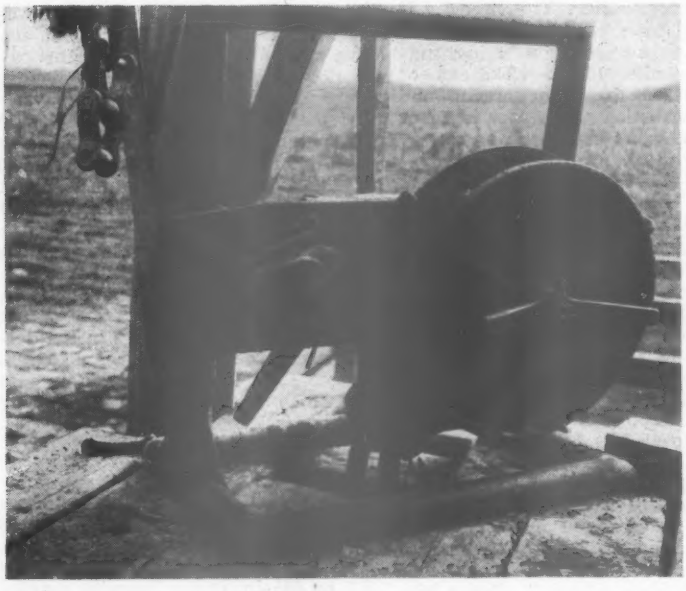
Some of the rigs in the field are using 3½-in. drill pipe and others 4½-in. pipe for drilling the 7⅞-in. hole. Intermediate hole is drilled with 5⅞ or 6⅝-in. drill pipe with several 8 or 9-in. drill collars on bottom. Drill-collar sections used in the smaller hole are from 100 to 150 ft. in length depending on the operator. About 125 ft. of 6-in. drill collar is the average. A single three-point reamer is generally used just above the bit.

The 3½-in. pipe performs satisfactorily and no trouble has risen which can be credited to its use. The tendency is to run a little more than the drill-collar weight on the bit and consequently some crooked pipe is developed. This is straightened at the rig. Rotating speeds are kept quite low to prevent excessive tool-joint wear. From 90 to 150 r.p.m. is the general speed range although some drillers drop back to around 70 r.p.m. for drilling the anhydrite. There is considerable difference of opinion on this point among drillers.

Practice is to core and drill completely through the pay and then run the 5½-in. pipe to bottom. The float and cement are then drilled out of the pipe but the guide or float shoe is left intact. The drilling of the cement is done with 3-in. flush drill pipe. The casing is then gun-perforated.

Rigs used in the field are mostly late-model power rigs using either two gas or diesel engines. One rig has a three-engine hookup. Total horsepower of engines on rigs at Embar runs from 370 to 600 hp. The 126-ft. derricks are set on substructures. As it takes from 70 to 90 days to drill the deeper Ellenburger wells and 45 to 50 days to drill the Tubb wells, the rigs are well assembled.

OPERATING IDEAS

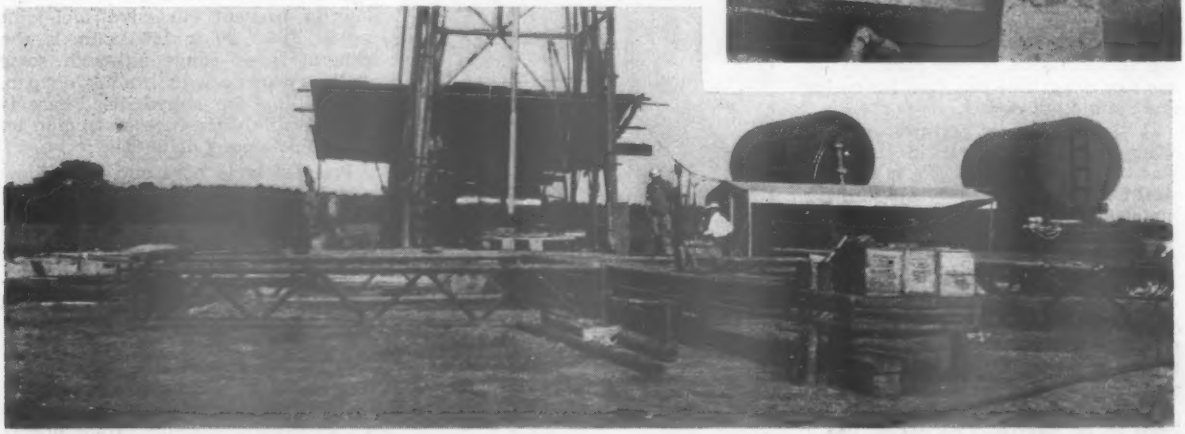


Anchoring Device for Dead End of Drilling Line

TO simplify the changing of position of the drilling line on the blocks, a Gulf Coast operator uses a convenient spool, on which the extra line at the dead end is coiled, and a special anchor for securing the dead line to the rig foundation. The spool is on the ground below the special anchor, shown in the accompanying picture, which is at the corner of the derrick floor. The line passes from the reel up to the derrick floor where it is held by the anchor. The anchoring device makes use of a cable-tool drilling clamp which will not injure the strands of the line. The wheel on the device makes for easy handling of the dead line. The anchoring device which is a movable unit, is held down by a loop of discarded drilling line secured to the derrick floor supporting beam below.

Chafing Bars for Boiler Front

TO protect the fire box and riveted end of the boiler from possible damage while being trucked to a new location, one drilling contractor equips his boilers with welded-in buffers or bumpers. Two sections of extra-heavy 2-in. pipe, drawn down at the ends, are welded across the end sheet of the boiler, between adjoining rows of staybolts so as not to interfere with inspection of these units. These pipe sections extend out from the boiler far enough to take the contact between boiler and truck bumper, and thus absorb the chafing and pounding of traffic which otherwise would come against the sheet.



Sectionalized Pipe Rack Built of Old Pipe

A SECTIONAL pipe rack and walkway that condenses to a very small part of a load to simplify moves has been built by an Oklahoma rotary-rig contractor out of old pipe. The rack, fabricated from 4-in. pipe, is in four sections, each section being a side. Set up, these sections are held together by pins, which can be removed quickly for dismantling. In moving, the four sections lay flat. The walkway is hinged in the middle so that it folds to proper load length. It is supported on horses, also constructed of 4-in. piping.

Designed for Saving Steel Time Money

IF YOU will chart the service record of Preformed "HERCULES" *(Red-Strand)* Wire Rope—as so many have done—you, too, will have definite proof of the savings that its use provides.

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Questions on Technology

by W. L. Nelson

Furnace Black for Synthetic Rubber

In The Oil and Gas Journal of August 27, 1942, page 32, use of the name furnace black is made. What is this material? M.L.R.

The term furnace black is not used extensively but appears to refer to the somewhat coarse, low oil-absorption lampblacks made from natural gas, gasoline hydrocarbons, or heavier petroleum oils such as kerosene, distillates or even fuel oil. The term furnace black is used in the title of Chapter 20 of Mattiello's book entitled "Protective and Decorative Coatings" Vol. II, John Wiley & Sons, 1942. The title of the chapter reads as follows: "Furnace Blacks or Low Oil-Absorption Lampblacks." Such types of lampblacks are produced, according to Ellis, "Chemistry of Petroleum Derivatives" Vol. II, Chapter 8, Reinhold Publishing Corporation, New York (1937), by nonimpingement processes (page 240) and by the incomplete combustion of liquid and solid hydrocarbons (page 242).

According to George C. and George A. Lewis in "Protective and Decorative Coatings," "As carbon black differs from lampblack, furnace blacks differ from both; but, owing to the color and tinctorial range of furnace blacks overlapping those of lampblacks, they are often referred to and sold under the name of 'low oil-absorption lampblacks', when offered as a pigment." And concerning manufacture—"When oil is used as raw material it is atomized under pressure and burned in a horizontal furnace with a controlled supply of air regulating the extent of incomplete combustion, which in turn determines the grade of the black produced."

"Gas is burned in either a vertical or horizontal furnace from large outlets, in a limited supply of air.

"In each case the products of combustion are led through long pipes to cool, and the carbon collected by electrical precipitation, spray systems, or bag filters." This method of collection is said to be cheaper than by the use of the collecting chambers used in the manufacture of true lampblack.

Properties of Furnace Blacks

The properties of furnace blacks are as follows:

"The bulk of these blacks is made from natural gas and used in the manufacture of rubber products. Furnace blacks made from oil are most widely used for the pigmentary properties in the decorative and protective-coating fields.

"Furnace blacks have the highest percentage of fixed carbon of all black pigments (from 95 to 99 per cent), which allows for very small quanties of occluded gases, entrained air, or volatile matter. They are of a very dense nature and pack about 25 pounds to the cubic foot.

"Color. Top color or mass tone increases in blackness as the particle size decreases (from 75 to 150 millimicrons) and covers the same range as lampblacks. Furnace blacks have a sheen or gloss similar to carbon blacks.

"Strength. Tinctorial strength increases with decreased particle size: the weakest commercial grades are equal to a medium-grade lampblack; the strongest are better than the highest-grade lampblack. Furnace blacks are two or three shades grayer than lampblacks of equal strength.

"Undertone. Furnace blacks possess a very clear blue undertone,

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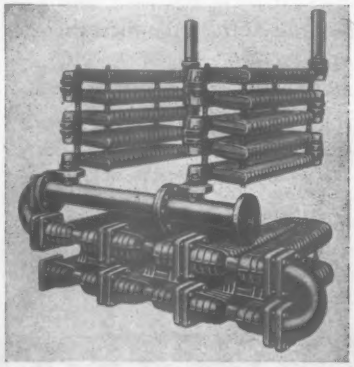

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When the call for scrap came the oil industry answered with a record turn-in. That was to be expected, for men in this industry never fail when given a job to do. Despite prompt delivery of hundreds of thousands of pounds, however, there is still valuable fighting material in the making lying idle around some leases. Much of the scrap metal poured into the foundries of the nation is already being flown, driven or sailed away to fight our battle for civilization. Enough helping hands could put it all to work. We know, from nearly half a century of first-hand experience with oil men, that they're not even beginning to slow up their efforts in this vital job.

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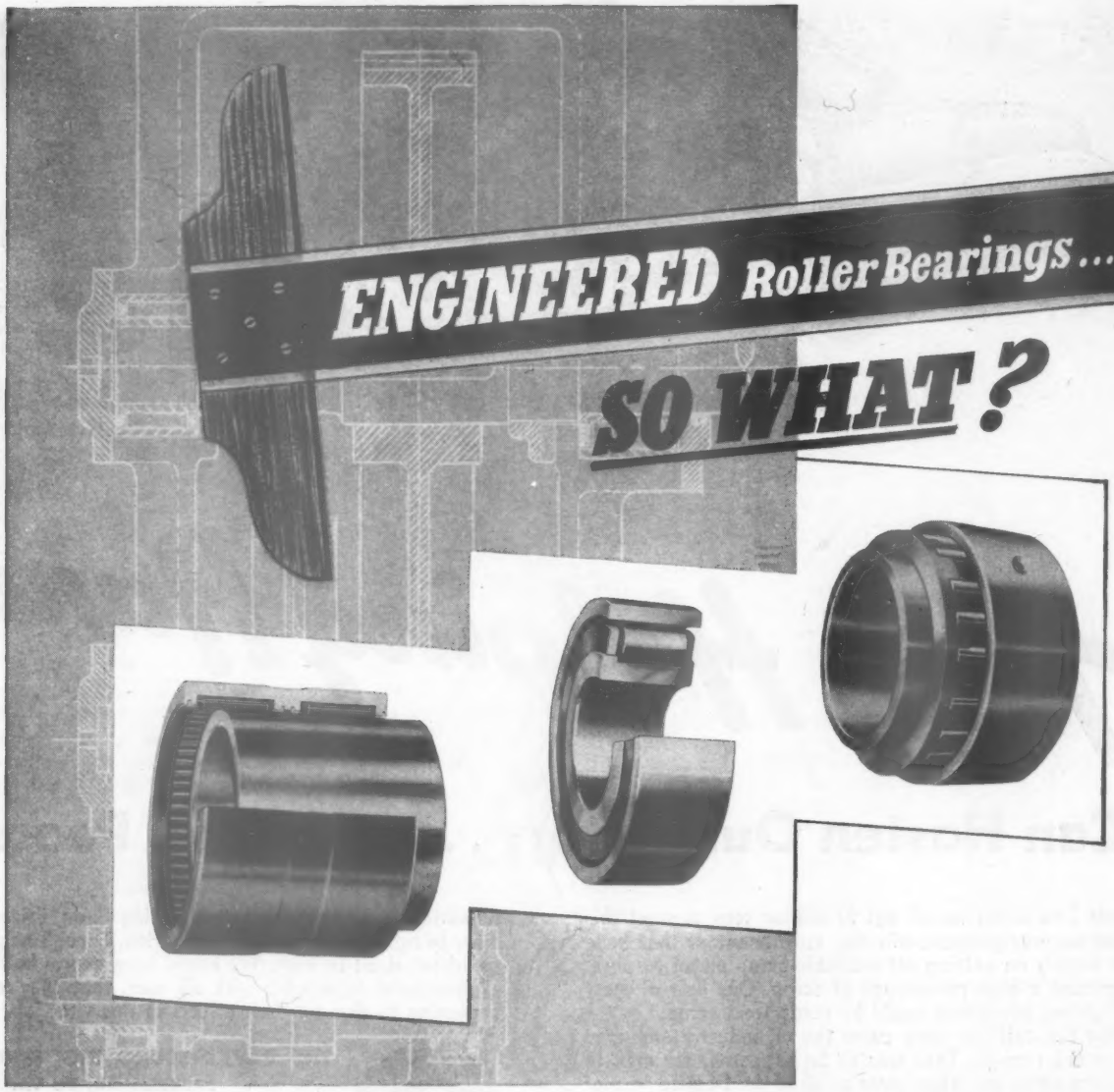

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which is present even in the strongest grades. This feature makes this black very desirable for tinting other colors.

"Absorption. As the name implies, the outstanding characteristic of this type of black is its low oil absorptio in comparison with true lampblack or carbon black. By the Venuto falling-drop test, furnace blacks absorb between 40 and 55 gallons of linseed oil per 100 pounds of black. The oil absorption increases with strength and color.

"With these comparatively low oil absorption values, furnace blacks can be used in paints and inks in high concentrations, and produce the jetness and strength of higher color carbons having a higher oil absorption.

"Dispersion. The name low oil-absorption lampblack given to furnace blacks is confusing to those more familiar with true lampblacks, especially in the dispersive qualities of the two blacks. Furnace blacks are much more difficult to disperse in oil vehicles than true lampblack. Although the two blacks are of similar particle size, the particle structure is quite different. Furnace black more resembles carbon black in difficulty of dispersion and great care must be exercised in incorporating and grinding it in oils or synthetic resins to eliminate floating and consequent streaking."

The reference in The Oil and Gas Journal of August 27, 1942, to furnace black suggests that it is particularly suitable for compounding with Buna-S type synthetic rubber. More furnace black can be used with this rubber than with natural rubber. Its greasiness and coarseness makes it act as a better binder material than regular carbon black. Finally, the yield of furnace black from natural gas amounts to 10-20 pounds per 1000 cu. ft., whereas the yield of regular black is only about 1.25 pounds per 1000 cu. ft.

The Gasoline Shortage?

I have heard of large companies pumping gasoline back into the ground for storage, and also of the blending of gasoline with distillate or fuel oil. When used in the latter manner it would seem that the specifications of distillate and fuel oil would need to be revised. I do not understand entirely why we have a gasoline surplus when so much gasoline is needed for the war.—A. R. S.

There are many rumors or stories, perhaps of a facetious nature, regarding the storage of gasoline in well-defined underground structures, but no definite programs of this nature have, to our knowledge, been adopted. Conditions in the gasoline market would have to become much worse than at present and would have to be of long duration to cause the adoption

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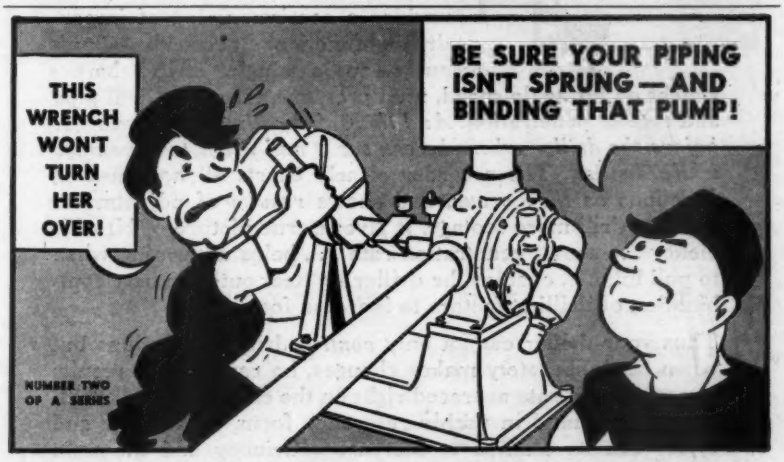

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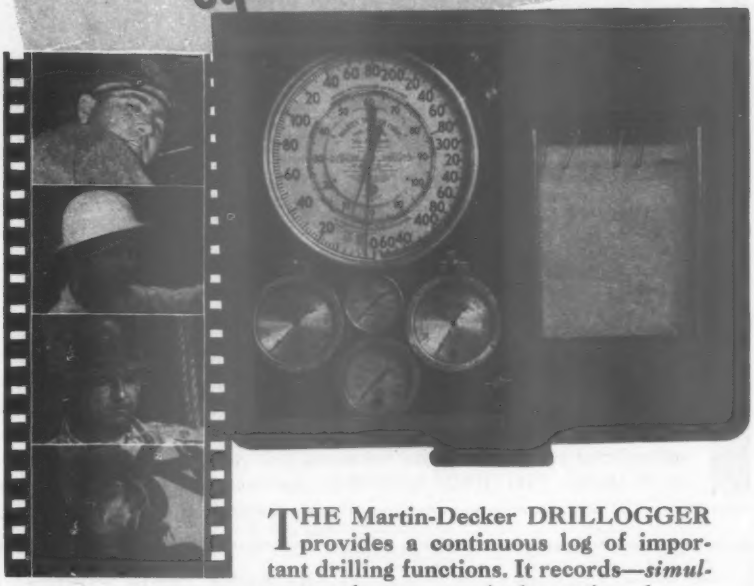

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of such practices. We understand that a few refiners have resorted to the burning of the heavy part of straight-run gasoline (so-called naphtha) as a fuel but the practice is not widespread nor does it account for an appreciable part of our production.

A more useful method of disposing of the temporary surplus of gasoline which now exists would be to build concentration plants at shipping and pipe-line origins—the lines and facilities which are used to transport gasoline to the East Coast. Gasoline and distillate could be separated from part of the crude oil and this concentrate could be mixed with what portion of crude oil would be necessary (as lubricating oils and fuel oil) at the East Coast. Thus, an enriched crude oil (rich in gasoline and distillate) could be sent east in much the same manner as raw natural gasoline is now mixed with crude oil and transported in pipe lines to refineries.

The specifications of distillate and fuel oil have not been formally changed to permit the incorporation of gasoline as a blending agent. Somewhat the same effect is being accomplished, however, by the production of lower boiling gasoline and kerosene, with the result that more distillate can be produced. Small amounts of kerosene or distillate may be admixed with residual fuel oil without getting too low a flash point.

Is There a Surplus of Gasoline?

Although gasoline stocks or the ability to produce gasoline is now somewhat above market production it is quite possible that the reverse situation may shortly arise. Actual figures on the requirements of the Army and Navy are not available but barring a most speedy and complete termination of the war, it is unescapable that large amounts of motor fuels will be required for military purposes in the near future.

Our present capacity to produce gasoline is somewhat as follows:

	Bbl. per day
New 100-octane plants being built	*300,000
Peacetime production	2,200,000
	2,500,000
Less equipment transferred to rubber, etc.	200,000
Approximate present capacity	2,300,000

Against this capacity to produce gasoline of 2,300,000 bbl. per day, the demands for gasoline are somewhat of the following magnitude:

	Bbl. per day
Fighting planes	*300,000
Training and transport planes	300,000
Army vehicles, tanks, trucks, etc.	500,000
Our allies, tankers sunk, storage, etc.	200,000
Unusual demands	1,300,000
For all civilian use (by difference)	1,000,000
Approx. present capacity	2,300,000

*A greater need, perhaps 500,000, is indicated.

STUDY OF MAXIMUM-PROFIT AND MINIMUM-COST POINTS

TOO often engineers are satisfied when their recommendations produce a moderate profit or show a reasonable cost. Many times the recommendation does not show either the minimum-cost point or the maximum-profit point for the investment. Often both of these points are directly proportional to the volume of business or the number of units produced and no exact maximum-profit or minimum cost can be forecast. While the maximum number of units may produce the minimum cost per unit, if may not produce the maximum profit. As always, the judgment factor must be given consideration.

The more complex the problem, the more it is necessary that the engineer use judgment backed by careful analysis, experience, and general knowledge. If in the consideration of a new project it is noticed that some factors decrease while others increase, an attempt should be made to find the maximum-profit or minimum-cost point. The following examples illustrate the general method of finding these points.

An oil company wishes to know the maximum-profit point for a small central generating plant used to furnish current for pumping wells. Experience from similar operations has shown a monthly net profit of $30 per well if the total number is under 20 wells and a decrease of $1 per well if the total number of wells exceeds 20. If P represent the profit and n the number of wells with n greater than 20, simple rules from the calculus show a maximum as follows:

$$P = 30n - n(n - 20)$$

$$= 50n - n^2$$

$$dP/dn = 50 - 2n$$

$$\text{If } dP/dn = 0,\ n = 25$$

Therefore 25 wells would produce the maximum profit. The same result may be obtained by plotting the original equation as is shown in Fig. 1.

Many nearly depleted fields are operated by many different operators, each managing to make a small profit. By a study of earnings and operating expenses, an operator may rather accurately determine how many wells will produce a maximum profit. The operator may then buy or sell some wells to bring his profit to a maximum for the equipment and investment.

The advantages of pooling are readily seen by a study of maximum-profit points. Certain equipment, as a pumping power, must be duplicated by each operator when a small part of it would be sufficient for a unit operation. There would be many factors left to the judgment of the operator. The amount of money available for the added investment, changes in the number of employes needed as caused by increased or decreased number of wells, partial use of time of employes, personnel problems as well as the position of additional wells on the structure of the field. However, the additional income for a definite period of time might be more beneficial than close adherence to conditions of maximum profit.

The minimum point is usually applied to cost but may be used in many ways. The minimum point should be desired by all users of metal in these days of scarcity. Assume that it is desired to make a cylindrical quart container from a minimum of material. If the total surface is represented by s, the diameter by d, the height by h, and it is remembered that a quart equals 231/4 cu. in., then,

$$S = 2(\pi d^2/4) + \pi dh$$

$$\text{and } V = 231/4 = \pi d^2 h/4 \text{ from which } h = 231/\pi d^2$$

$$\therefore S = \pi d^2/2 + 231/d$$

$$ds/dd = \pi d - 231/d^2 = 0$$

$$\text{and } d = \sqrt[3]{231/\pi}$$

$$\text{But } h = 231/\pi d^2 = \sqrt[3]{231/\pi}$$

$$\therefore d = h$$

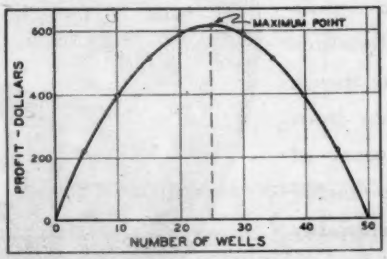

Fig. 1

If the mathematics involves forgotten formulas and operations, the same result may be obtained by making a graph of the original equation. Either the calculations or the graph shows a minimum of metal would be used if quart cans had their height equal to their diameter. Actual measurement of common quart cans used by most oil companies for motor oil shows a waste of about 20 sq. in. of metal or approximately 26 per cent per can. While there are some judgment factors to be considered, the scarcity of metal should cause engineers to avoid all forms of waste.

It would seem that the same rule, height equals diameter, would hold for cylindrical storage tanks for crude oil. However, it is well known that many factors enter into tank design and that these factors vary greatly in different localities and even in the same locality at different times. Horton* has shown that the "cost per barrel of storage decreases as the size of tank increases up to a certain diameter and height. . . . The limiting size, under A.P.I. specifications, would have a diameter of 276 ft., a height of 45 ft., and a capacity of 475,000 bbl. if the tank were built in West Texas at the present time" (1928). Thus we see that other factors of design and stress cause storage tanks to vary greatly from diameter equals height as the capacity becomes large. Small capacity steel tanks of A.P.I. specifications can be furnished in either high or low designs with the diameter approximately equaling the height in the high group.

The more accurately the engineer is able to compare costs, length of services and revenues, the more accurately he can determine the net income. It is his responsibility to understand and apply the general principles of economic selection, which are the same regardless of the size and cost of the equipment to be purchased. He must have breadth of vision to see all the component parts of a project and still see them as an integrated unit. It must be emphasized that the judgment factor may often cause a reversal of mathematical conclusions.

*Horton, G. T., Cost per Barrel of Storage Is Less in Larger Size Tanks, The Oil and Gas Journal, Apr. 19, 1928, p. 166.

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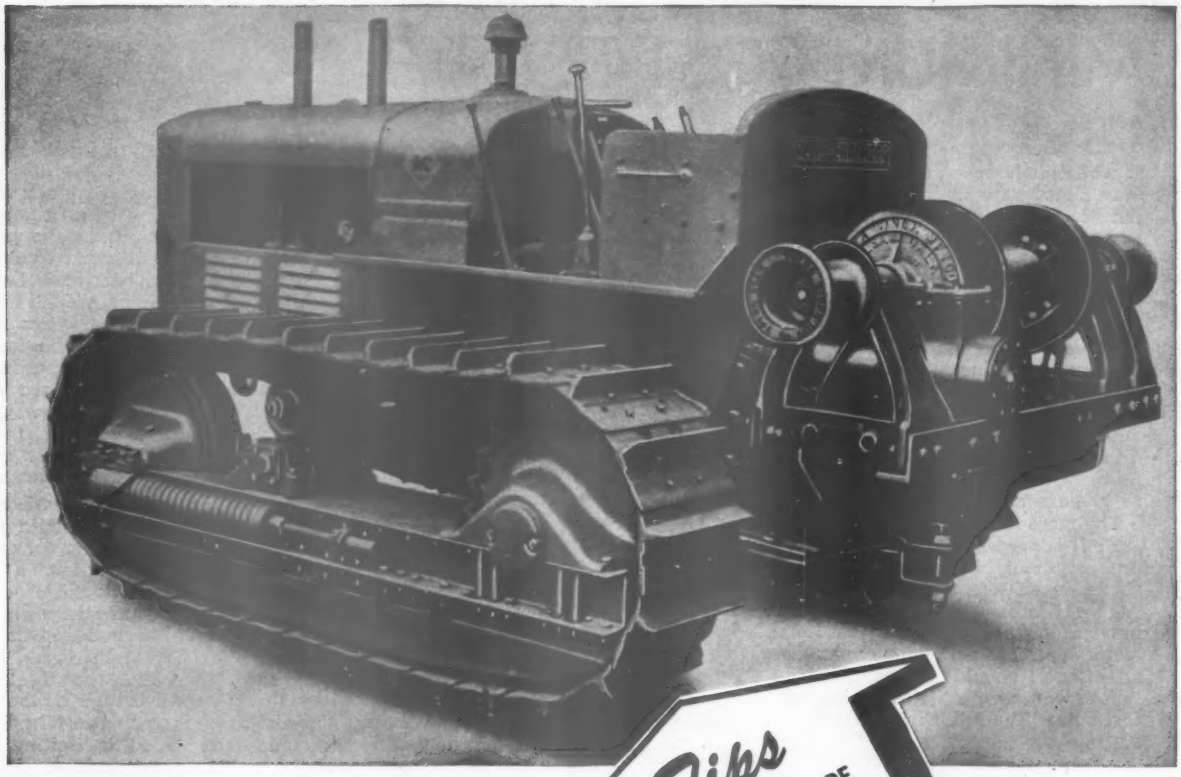

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A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

GAS COMPRESSION AND EXPANSION

THERE are three different thermodynamic processes by which a gas may be compressed or expanded, namely: isothermal, adiabatic, and polytropic. An understanding of these three processes forms an essential background for the proper understanding of gas compressor calculations.

Isothermal compression or expansion refers to a change in which the temperature of the gas remains constant throughout the process. Since it can be shown that less work is required to compress a given quantity of gas through a given pressure range by the isothermal process than by either of the other two processes, an effort is made to have the compression and expansion of a gas in a compressor cylinder approach the isothermal as nearly as is practically and economically feasible. This is accomplished by water jacketing of the compressor cylinder. But since it is impossible to justify economically sufficient water jacketing to maintain the gas in the cylinder at a truly constant temperature, isothermal compression is rarely, if ever, attained in practice.

Boyle's law* can be applied to the pressure-volume relationship existing when a certain weight of a gas is compressed or expanded isothermally. That is,

$$P_1V_1 = P_2V_2 = C \qquad (1)$$

Where C is a constant, and the subscripts 1 and 2 refer to different pressure and volume conditions of the same weight of gas.

When a gas is compressed without any transfer of heat to or from the gas, the process is termed **adiabatic** compression. When a gas is expanded without any transfer of heat to or from the gas, the process is called **adiabatic** expansion. These adiabatic processes are of fundamental importance as a background for an understanding of the considerations involved in engineering calculations dealing with gas compression. This is true in spite of the fact that no gas compressor actually compresses or expands gas adiabatically, because there are always exchanges of heat between the gas being compressed (or expanded) and the surface of the compressor cylinder and piston. These variations of the actual compression cycle from the theoretical adiabatic cycle are desirable because of the saving in work that is effected by making the process more nearly approach the isothermal, and because of the elimination of high cylinder temperatures that may be damaging to the compressor valves and other parts.

When gas is compressed adiabatically, the result of the process is an increase in the internal energy of the gas; or, expressed more simply, such a process causes a rise in the temperature of the gas. On the other hand, when a gas expands adiabatically the internal energy of the gas is decreased; or, in other words, the temperature of the gas is lowered.

Using the perfect gas law* and other thermodynamic considerations, it can be shown that,

$$P_1V_1^k = P_2V_2^k = C \qquad (2)$$

where

- V = volume of gas in any convenient units
- P = absolute pressure of the gas in convenient units
- k = ratio of specific heat at constant† pressure to specific heat at constant volume for the gas. C_p/C_v†
- C = a constant

(The subscripts 1 and 2 refer to different pressure and volume conditions of the same weight of gas.)

In actual compression of gas there is always some change in temperature, so that the process is not isothermal. And, too, there is always some transfer of heat due to radiation, water jacketing, and other causes, which means that the process is never adiabatic. So the actual compression will be intermediate between the isothermal and the adiabatic. Such a process is called **polytropic.**

In a polytropic compression or expansion process the relation between pressure and volume is very similar to that of an adiabatic process. The only difference is that the exponent k in equation (2) above is replaced by another exponent n which is not equal to the ratio of the specific heats (C_p/C_v).

So the equation for a polytropic change may be written,

$$P_1V_1^n = P_2V_2^n = C \text{ (A constant)} \qquad (3)$$

where all terms are as already defined with equations (1) and (2). The "n" value may be determined by analysis of an indicator diagram from a compressor using a method that will be described later in this series. The value of "n" will be greater than 1.0, since this is the value for an isothermal change; and will be less than k (the ratio of the specific heats, C_p/C_v), since this is the value of the exponent for an adiabatic change. The value of "n" within this range will be influenced by a number of factors which include (1) characteristics of the gas compressed, (2) degree of cooling, (3) condition and design features of the compressor valves, (4) fit of piston rings in the compressor cylinder.

The essential differences between compression by isothermal, adiabatic, and polytropic processes are shown in Fig. 1. The diagram shows the changes in volume that occur in compressing 100 cu. ft. of air from initial conditions of 15 lb. per sq. in. abs., to final conditions of 100 lb. per sq. in. abs. by the three processes. Curve A represents isothermal compression (exponent of compression = 1.0). Curve B represents polytropic compression (if n = 1.2). Curve C represents adiabatic compression (k = 1.40). Curve B lies above Curve A, because the temperature rise of the polytropic process causes the compressed volume at a given pressure to exceed the volume that would result from isothermal compression. Likewise, Curve C lies above Curve B, because a still greater temperature rise occurs in the adiabatic process.

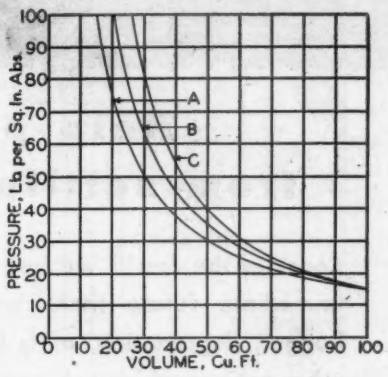

Fig. 1

*See Installment 10.

†See Installment 62.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

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Consider the cost if we lose this war. For the immediate future there would be slavery, hunger, degradation, as is already the lot of other nations which only wanted peace and to be let alone each to work out its separate destiny. For years to come we would be struggling to regain freedom of worship, freedom to explore unhampered science and art, freedom to be individuals again.

Your buying War Savings Bonds to the very limit of your ability will help clothe, feed and arm our boys and transport them to the front lines so that they may roll back the scourge of civilization—the present day Jenghis Khan.

In addition to insuring liberty and the good things which our way of life has made possible far beyond the fondest dreams of other peoples, your buying War Savings Bonds regularly will give you the cash after the war to buy the wonderful new cars, television sets, labor-saving appliances for the home, and the many miracles of the new age of plastics and chemurgy. An immense purchasing reservoir of money built up by millions of bond buyers will help insure continued prosperity and employment after victory.

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Journalog

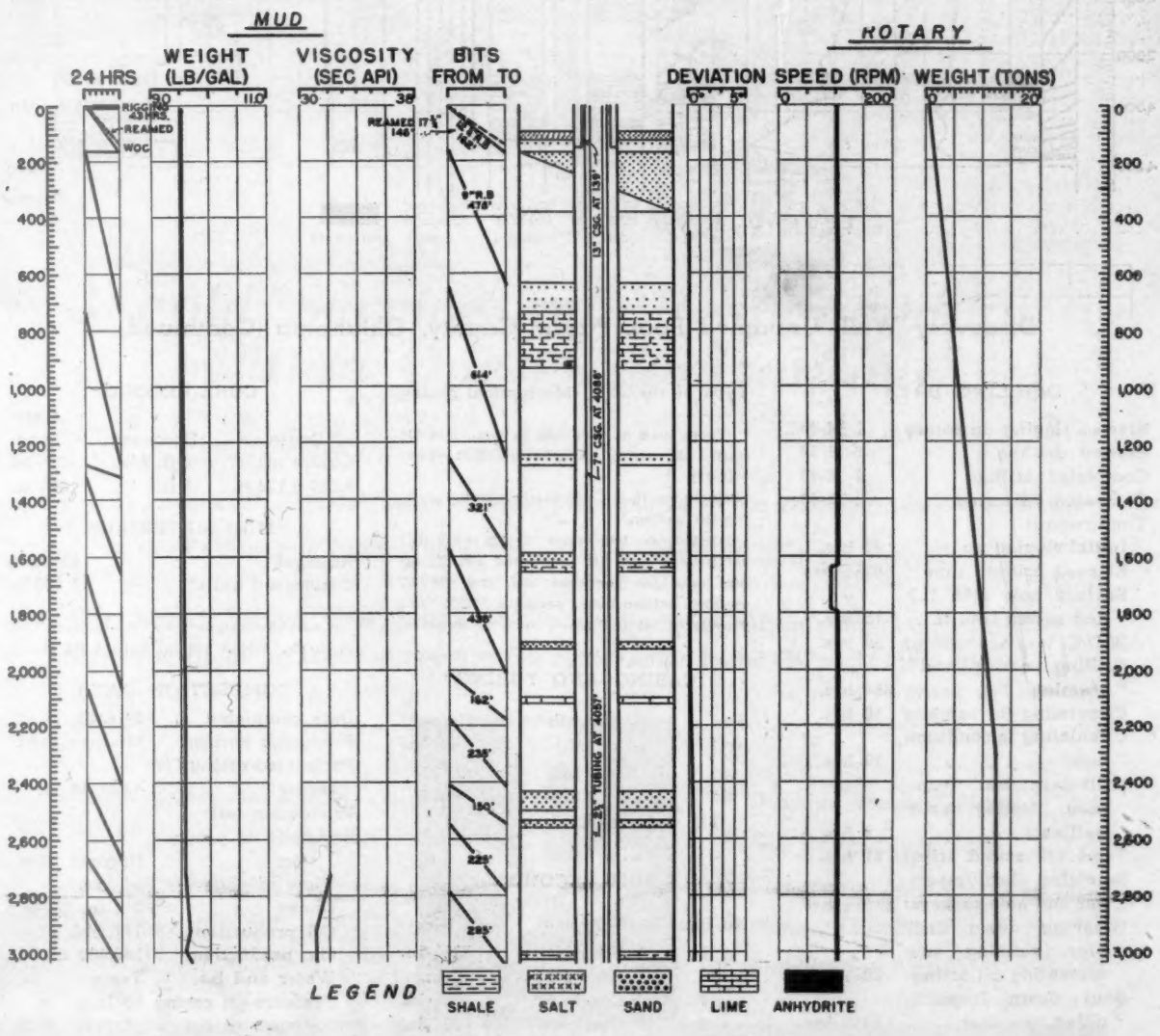
No. 28

A FEATURE OF THE OIL AND GAS JOURNAL

AMERADA PETROLEUM CORP.-STANOLIND OIL & GAS CO.
1 JENNIE E. INGHAM
SW NW SE 28-20n-4e. Elevation 965 ft.

CONTRACTOR
CREEKMORE DRILLING CO.
TULSA

Discovery Well, Unnamed Pool, Payne County, Oklahoma



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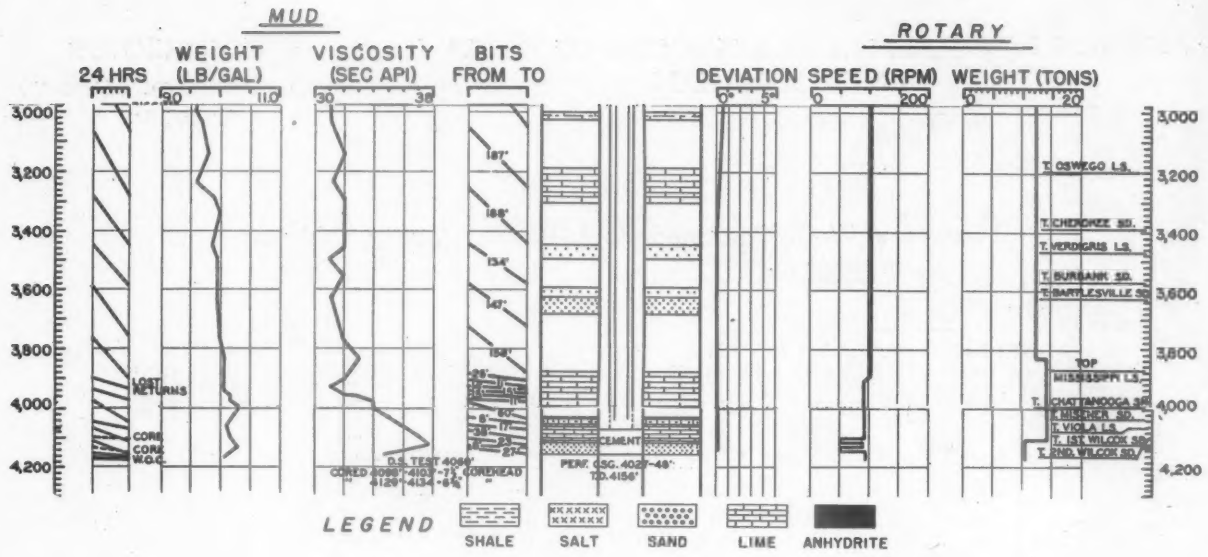
Journalog



Discovery Well, Unnamed Pool, Payne County, Oklahoma (Continued)

DRILLING DATA

Started rigging up rotary	1-14-43
Started drilling	1-16-43
Completed drilling	2- 8-43
Cemented oil string	2-16-43
Time record:	
Initial rigging up	43 hrs.
Elapsed drilling time*	603½ hrs.
Surface hole (162 ft.) and casing (146 ft.)	18 hrs.
W.O.C. (surface casing)	50 hrs.
Drilling, coring and reaming	354 hrs.
Circulating for samples	10 hrs.
Circulating to condition hole†	30 hrs.
Drill-stem test (running, testing and pulling)‡	9 hrs.
Trips (32 round trips)	81 hrs.
Servicing (Schlumberger and hole surveys)	5½ hrs.
Breaking down drill pipe, running and cementing oil string	20½ hrs.
Shut down (repairs, oiling, weather)	43½ hrs.

Type of rig ..... Mechanical rotary

*From time of spudding (3 a.m., 1-16-43) until oil string plugdown (6:30 a.m., 2-10-43).

†Includes 16 hr. circulating while waiting on casing.

‡Drill-stem test total depth 4,078 ft.; set packer 4,032 ft. Recovered 530 ft. oil and mud (75 per cent oil), and 120 ft. water; bottom-hole pressure 1,550 lb.; gravity of oil 38.5°; tool open 35 minutes.

CASING AND TUBING

Size (in.)	Depth (ft.)	Cement (sacks)
13	139	115
7	4,088	300
2½ (tubing)	4,057	...

BIT RECORD

No. bits	Type	Size
1	Rock bit	12¼-in.
27	Rock bit	9-in.
1	Corehead	7½-in.
1	Corehead	6¾-in.

CORE RECORD

Depth	Recovery	Corehead
4,098-4,103 ft.	4 ft. 7 in.	7½-in.
4,129-4,134 ft.	5 ft.	6¾-in.

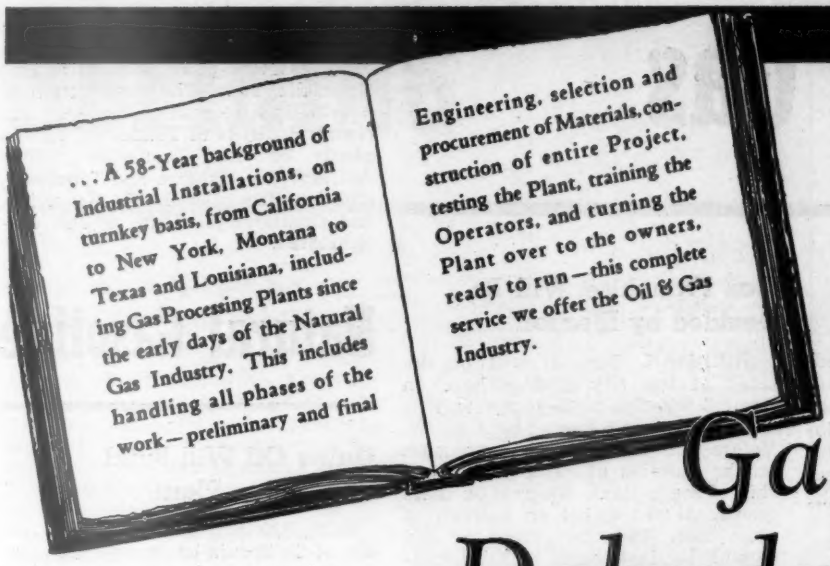
MUD MATERIALS

Aquagel	68 sacks
Cottonseed hulls*	1,400 lb.

*Lost circulation 3,916 ft.; added 1,000 lb. hulls. Added 400 lb. hulls 3,964 ft.

COMPLETION DATA

Date completed	2-16-43
Producing horizon	Misener sand
Perforated casing (47 shots)	4,027-48 ft.
Production test:	
Method of production	Natural flow
Time of gage	24 hrs.
Choke	2½-in.
Oil production	177 bbl.
Gas production	198,000 cu. ft.
Water and b.s.	Trace
Pressure on casing	60 lb.
Pressure on trap	6 lb.


. . . A 58-Year background of Industrial Installations, on turnkey basis, from California to New York, Montana to Texas and Louisiana, including Gas Processing Plants since the early days of the Natural Gas Industry. This includes handling all phases of the work—preliminary and final
Engineering, selection and procurement of Materials, construction of entire Project, testing the Plant, training the Operators, and turning the Plant over to the owners, ready to run—this complete service we offer the Oil & Gas Industry.

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2. FABRICATION of all Processing Equipment in our own Shops.
3. CONSTRUCTION with our own field personnel and equipment.

This 3-Fold Service and Responsibility within one organization—important factors in planning plant economy—our contribution to the Oil and Gas Industry.

- Our ability to handle all phases of Projects speeds completion and assures efficient, economical installations.

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- *Compressor Stations*
- *Natural Gasoline Plants*
- *Stabilization Plants*

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Natural Gas

Consolidate Gas Utilities Corp. to Abandon Service

WASHINGTON, D. C.—The Federal Power Commission has announced its order authorizing Consolidated Gas Utilities Corp., with principal offices in Oklahoma City, Okla., to abandon the sale of natural gas to W. S. Fees of Iola, Kans. At the same time the commission issued a temporary certificate of public convenience and necessity authorizing Consolidated to construct and operate facilities for the delivery of not more than 10,000,000 cu. ft. of natural gas per day to Gas Service Co. in Wichita, Kans. The delivery of 2,000,000 cu. ft. of this gas, which will be distributed in Wichita and vicinity pursuant to WPB directives, is made possible by abandonment of service to Mr. Fees, the orders say.

The commission's order in regard to Docket G-438 states that "by reason of the present war emergency, the public interest requires the issuance of a temporary certificate of public convenience and necessity authorizing applicant to construct, install and operate" the facilities for effecting the connections between Consolidated's pipe line and that of the Gas Service Co. The certificate is issued for the duration of the present war emergency, the order continues, but not beyond 90 days after the cessation of hostilities and authorizes the applicant to deliver not more than 10,000,000 cu. ft. of natural gas per day to Gas Service Co. The order stipulates that it is without prejudice to the authority of the commission with respect to rates, valuation, costs, service, accounts, the determination of service areas, or any other matters now pending or which may come before the commission, and that in the event Consolidated desires to continue the facilities beyond the period of the temporary certificate it shall file a formal application for a certificate of public convenience and necessity.

The Consolidated Gas Utilities Corp. is engaged in the production of natural gas in Texas and Oklahoma for resale for ultimate public consumption in Oklahoma and Kansas and also purchases natural gas in Kansas, a part of which is transported and sold for resale for ultimate public consumption in Kansas, Missouri and Nebraska.

Gas Franchise Will Be Decided by Election

SHERMAN, Tex.—It will be decided at the city election here on April 6 whether a 25-year franchise shall be granted Lone Star Gas Co. Voters will also express an opinion on the question of municipal ownership of a gas plant. Election on these questions was called on petition of more than 500 voters after the city commission had passed on third reading an ordinance granting a franchise to Lone Star, with Mayor R. L. Hall protesting. Presentation of the petitions put the matter before the electorate and placed the franchise in abeyance.

Tennessee Gas Hearing Postponed Until June 1

WASHINGTON, D. C. — The hearing previously scheduled to have been reconvened March 10 on an application by the Tennessee Gas & Transmission Co., Chattanooga, Tenn., for a certificate of public convenience and necessity to construct and operate a natural-gas pipe line from southwestern Louisiana gas fields to Nashville, Chattanooga, Knoxville, and other Tennessee communities, has been postponed until June 1. The hearing, which began on January 18 in Nashville, Tenn., and was adjourned by the commission's trial examiner on February 2, will be held in Washington, D. C.

In addition to rendering full service to the Tennessee Valley area, the applicant states that with a single compressor station the proposed line could make 100,000,000 cu. ft. of gas per day available for transmission into Ohio and Pennsylvania to relieve a threatened gas shortage in the Appalachian area, and that with full compression not less than 200,000,000 cu. ft. could be delivered daily to companies in the critical area.

The proposed pipe-line system will consist, according to the applicant, of gathering lines to transport natural gas to a point of convergence near Eunice, La.; a main line, 24 in. in diameter, to transport the gas through Louisiana and Mississippi to a point near Muscle Shoals, Ala., thence to Brace, Lawrence County, Tennessee. From Brace, two main lines will diverge, one of which, either 16 or 24 in. in diameter, will transport gas to a point near Nashville, Tenn., and the other, 12¾ in. in diameter, will carry gas to a point near Alcoa and Knoxville, Tenn. The construction of lateral lines to reach aluminum and chemical plants in Tennessee, certain plants of the Tennessee Valley Authority in Alabama and Tennessee, and the cities of Nashville, Knoxville, and Chattanooga, Tenn., is also contemplated.

Natural Gasoline

Union Oil Will Build Absorption Plant

LOS ANGELES, Calif.—Union Oil Co. of California has completed plans for the erection of an absorption plant to be located in the Santa Maria Valley area of California, and early construction is contemplated. This new plant in addition to being necessary to handle increased production of natural gas, will make available additional quantities of isobutane.

WPB has approved allocation materials for the new facility, which will be located on the company's Lattles lease. The new plant will require an investment of more than a half million dollars and will have capacity to handle 18,000,000 cu. ft. of wet gas per day. Wherever possible, used materials will be utilized in the construction program. Some of the equipment will be obtained from other Union Oil properties; a considerable amount of used material will be obtained from other oil companies.

In addition to providing natural-gas-treating facilities, the new absorption plant will also make available to the Santa Maria Valley district a plentiful supply of dry gas for either domestic or commercial consumption, as well as an added source of supply for other coastal population centers.

Continental Lets Contract For $500,000 Wyoming Plant

Contract for natural-gasoline facilities at Lusk, Wyo., has been awarded by Continental Oil Co., to Stearns-Roger Manufacturing Co., Denver, Colo., covering estimated expenditure of $500,000.

Salem Plant Moved

One of the two natural-gasoline plants of Sunflower Natural Gasoline Co. in the Salem, Ill., field, is being dismantled for transfer to the Benton field in Franklin County, Illinois. George Engle, president, said $250,000 would be spent for new equipment for the Benton plant.

REFINING

Standard of California Forms Chemical Subsidiary

SAN FRANCISCO, Calif.—Standard Oil Co. of California's new subsidiary chemical company, the Oronite Chemical Co., started operations March 1. Increasing versatility of petroleum in the development of important chemicals led to formation of the new concern. Oronite will handle the production and distribution of a wide variety of industrial chemicals derived from petroleum hydrocarbons.

H. D. Collier, president of Standard of California, is chairman of the Oronite board, and R. G. Smith is president. Vice presidents are R. G. Follis and M. L. Baker. B. W. Letcher is secretary and H. C. Judd treasurer, with Messrs. Collier, Follis, Smith, Baker, T. G. Hughes, J. H. MacGaregill and T. S. Petersen serving as directors. K. N. Cundall has been appointed sales manager.

"The Chemistry of World War 2," said Mr. Collier in discussing the new company, "is largely based on the byproducts of petroleum, as the chemistry of World War 1 was based on the byproducts of coal. The list of products that can be made from petroleum is almost unbelievable. It includes plastics, synthetic silks, alcohol, ammonia, formaldehyde and many other things of value to modern industry and modern living."

Texas Co. Offer Accepted For Indiana Refining Co.

NEW YORK.—Texas Co.'s offer to purchase all assets of the Indian Refining Co. which operates a 28,000-bbl. refinery at Lawrenceville, Ill., was approved here last week by Supreme Court Justice Louis A. Valente. The Texas Co. will issue one share of its stock for each four shares of Indian Refining. The offer was made in settlement of a suit brought by the minority stockholders of the refining company.

Sites Selected for Five New Alcohol Plants

WASHINGTON, D. C.—Selection of sites for five new alcohol plants to operate on grain was announced today by the Chemicals Division of the War Production Board. The sites are at Carrollville, Wis.; Dubuque and Keokuk, Iowa; and Moline and Peoria, Ill. Plants on these sites are designed to produce a minimum of 36,000,000 gal. per year on a basis of recovery of feed values for livestock.

The minimum output from the plants on these new sites will bring the country's alcohol production to a point where all projected requirements can be supplied including the heavy demands for synthetic rubber. At the same time, the recommendations of the Baruch report for 100,000,000 gal. per year of new capacity will be substantially fulfilled by these plants and by new capacity which has previously been authorized.

The sites chosen have been selected after study of over a hundred possible locations and have been approved by the Rubber Director's office. The site survey was conducted by the engineering staff of the Alcohol and Solvents Section of the Chemicals Division and the United Engineers & Constructors, Inc., which was retained by the Defense Plant Corp. for this purpose. Consideration of location on navigable waterways near grain supply, transportation of alcohol by tank car, and available steam supply from existing boiler capacity were factors in determining the selection. Plants to be erected will be of special wartime design calling for a minimum usage of critical material.

Selection of operators for these plants will be made by the Chemicals Division with due consideration to recommendations of the Rubber Director's office.

ODT Issuing Certificates On In-Transit Handling

WASHINGTON, D. C.—The Office of Defense Transportation has begun issuing certificates of request for in-transit handling to oil companies and others eligible for compensatory adjustments, covering special wartime costs of moving petroleum and petroleum products into District 1 by substitute methods, it was announced.

The certificates of request are issued under Regulation 1 of Defense Supplies Corp., Amendment 1, which provides, in part:

"If in-transit handling is incurred by applicant under the substitute method of transportation on or after January 1, 1943, then the normal cost

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Let Allen ventilation engineers help you to attain the perfect ventilation which is needed for top production of war fuels. Many types of Allens,—wind-driven, power-operated and stationary.

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Cast and Forged STEEL
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Reconditioned - Guaranteed
to perform like new

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TYPE "C"
CHEMICAL MEASURING
PUMP
Extremely Economic
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Accuracy of delivery in McCord chemical pumps is the result of a finely engineered design with a minimum number of parts. Dependability is insured because working parts are fully enclosed, protected from dirt and the elements. Specify McCord. For sale by National Supply Co.
Standard of the Oil Fields
McCORD
RADIATOR & MFG. CO., DETROIT, MICH.

of in-transit handling shall be deducted from the applicant's claim and the substitute cost of in-transit handling may be included in such applicant's claim, provided such in-transit handling was incurred pursuant to the prior written request of the Office of Defense Transportation.

"If in-transit handling is or has been incurred by an applicant under the substitute method of transportation prior to January 1, 1943, then the normal cost of in-transit handling shall be deducted from the applicant's claim and the substitute cost of in-transit handling included by such applicant in his application filed hereunder, provided such in-transit handling was incurred pursuant to the request of the Office of Defense Transportation or the Office of the Petroleum Coordinator for War (now Petroleum Administrator for War) and the inclusion thereof is approved by the Office of Defense Transportation."

Persons eligible to apply for petroleum compensatory adjustments have been defined by DSC as follows:

"A person who produces, manufactures, acquires or purchases crude or compensable products in Districts 2 or 3 and imports the same, by substitute method of transportation, for manufacture or sale within District 1, or who makes a compensable intra-district movement . . ." or "any person who, during the 12-month period ending June 30, 1941, regularly imported compensable products for his own consumption within District 1, and who imports, by substitute method of transportation, compensable products from Districts 2 or 3 for his own consumption in District 1."

Application forms for the certificates are available at the office of Fayette B. Dow, Room 5128 Interstate Commerce Building, Washington.

What's Going On At the Plants

Pure Building Codimer Unit

PURE OIL CO. is building a codimer plant at its Heath, Ohio, refinery. A. W. Michner, engineer at the company's Chicago, Ill., headquarters, is spending part of his time at Heath where he is doing engineering work on the codimer unit.

Republic Contract Expanded

ADDITIONAL plant facilities at Republic Oil Refining Corp.'s refinery at Texas City, Tex., costing approximately $245,000 have been contracted to Frick-Reid Supply Corp., which is now building other parts of an aviation-gasoline unit there for Defense Plant Corp.

Crown Central Adding Laboratory

CONTRACT has been awarded for construction of a laboratory building and facilities at Crown Central Petroleum Corp.'s Houston, Tex., refinery to cost approximately $40,000. Contract was awarded by Defense Plant Corp. which is also financing construction of war-product facilities at the Crown Central refinery.

Sketches of Plant Operators

WILLIAM NADEN, superintendent of the Everett, Mass., refinery of Colonial Beacon Oil Co., Standard Oil Co. of New Jersey subsidiary, has been appointed general superintendent of the latter company's Baltimore refinery. Mr. Naden succeeds John F. Ewing, who has been assigned to special duties anticipating his retirement.

Mr. Naden is a graduate of Lowell Textile Institute. His first position with Colonial Beacon was as a chemist which he took December 19, 1927. The following June he was appointed assistant foreman of the treating plant and on June 26, 1929, was made assistant to the general superintendent. He became general superintendent July 1, 1934.

Coincidently with Mr. Naden's transfer, Paul C. Shea, Colonial Beacon vice president, announced the appointment of Joseph E. Murphy and Charles H. Cole as assistant general superintendents at Everett. Mr. Murphy will have charge of process, mechanical and guard departments and Mr. Cole of the administrative, laboratory, process control, engineering, accounting and distribution departments.

HIS TARGET IS A STRUCTURE IN THE WILCOX!

The geophysical industry is waging total war, too. Specific objective is to maintain the already established favorable balance between oil supply and demand so that our fighters may never want for such war essentials as toluene for explosives, butadiene for synthetic rubber, and high octane aviation gasoline.

GENERAL'S skilled crews are in the thick of the fight. And when victory is won they will be even more capable of assisting you in planning your drilling program . . . geared to peacetime needs for petroleum.

General
GEOPHYSICAL COMPANY HOUSTON

CRC

PIPE LINE
CONSTRUCTION
EQUIPMENT

CRUTCHER-ROLFS-CUMMINGS
Pipe Line Equipment and Materials
Houston, Texas, U. S. A.

PIPE LINES

WEP Stakes Route For 20-In. Line

Staking of the right-of-way for the War Emergency Pipelines, Inc., 20-in. products line started early this week for the section between Beaumont, Tex., and Little Rock, Ark. For the remainder of the distance eastward, the line will parallel the 24-in. crude-oil line. Contrary to some recent reports the WEP organization continues to plan on having the 20-in. and the 24-in. lines meet at the Little Rock pump station and not at a point 80 miles northeast.

In the last week in March it is expected that mills will be manufacturing 20-in. pipe for the Beaumont, Tex.,-Seymour, Ind., leg. Elsewhere in this issue an article appears discussing the decision reached by Petroleum Administrator Harold L. Ickes to apply to WPB for steel to build the 20-in. line the entire distance from Beaumont to the New York-Philadelphia area. Plans are now being made by WEP for the manner in which the Beaumont-Seymour leg will be comstructed. Pipe laying is expected to start early in April. Questions continue to be raised by pipe-line men throughout the country regarding the reasons for having a terminal at Seymour, Ind., when ample facilities for moving shipments eastward temporarily will be available at Norris City, Ill. Inevitable delays, difficulties and expense involved in the construction of the Seymour terminal threaten to interfere with the effectiveness of the 20-in. line.

Shipments of crude oil by tank car from the Norris City terminal of the 24-in. line were increased last week. Loading racks are about two-thirds completed. Installation of electrical fixtures for two racks was completed early this week. Because of delays in obtaining equipment, completion of

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500 Fifth Avenue, New York, N.Y.
St. Louis Park, Minneapolis, Minn.

PIPE-LINE PERSONALITIES

JOE B. TIMS, superintendent, pipe-line department, Lion Oil Refining Co., was originally employed in 1923 as gager in the South field of the El Dorado, Ark., area. At that time the organization was known as Lion Oil & Refining Co. Formerly he had worked for El Dorado Natural Gas Co. and the Standard Pipe Line Co. of Louisiana. During the boom he moved to El Dorado from East Texas where he had been born and brought up.

At the time Mr. Tims started working for Lion interests, the organization had a small refinery with limited gathering-line facilities moving oil only from the El Dorado South field; the company then owned no production of its own.

As the Lion operations expanded and the pipe-line system extended into new areas, he was transferred to Smackover and later to other fields in Arkansas from which the company was transporting oil.

In 1931 Mr. Tims was promoted to the position of district gager and had charge of dispatching all of the oil bought by Lion from Arkansas producers. He became superintendent of the pipe-line department in 1937.

He has taken an active interest in developing equipment particularly adapted to the practical field requirements of the area in which the company operates. Economy and efficiency have been achieved as a result.

Mr. Tims is married and the father of two children, Jo-Ellen, 11, and James Otis, who joined the Navy on his seventeenth birthday, December 7, 1942.

the third rack may require more than a week.

Between March 20 and 25 all of the stations on the 24-in. will probably be finished. At present the stations in operation are Nos. 1, 3, 5, 7 and 9a. Water contamination is being rapidly reduced and air in the 24-in. line is practically all eliminated. No trouble with ice was encountered at any time since fluid began to flow from Longview, Tex., to Norris City. From the standpoint of hydraulics the 24-in. line itself is now operating satisfactorily.

This week Williams Brothers Corp. is engaged in work at the Mississippi River for two crossings, one for a second 24-in. crossing for the crude line and the other for the first crossing of the 20-in. line. By the end of last week more than 120 miles of 24-in. line had been laid for the eastward extension.

Work Begins on DPC Corpus Christi Project

HOUSTON, Tex.—Construction work commenced last week on the 14.8 miles of 12-in. line from Pierce Junction to Galena, which will connect with the 150 miles of line from Refugio to Pierce Junction formerly owned by the United Gas Pipe Line Co. and used for transmission of natural gas. The old gas line is to be converted to oil service. Humble Pipe Line Co. is acting as agent for Defense Plant Corp. in the whole project, which is designed to carry crude and refined products from the Corpus Christi area to the Houston-Beaumont, Tex., territory.

Contract for the 14.8-mile extension from Pierce Junction to Texas Co. storage at Galena, on the north side of the ship channel, and for 3 miles of line to be built between Refugio and that end of the old natural-gas line was awarded to Williams Brothers Corp. The construction company last week put bulldozers, ditching machines, tractors and welding equipment in the field at the Pierce Junction end of the projected line.

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THE ONE BOLT COUPLING

UNIBOLT XMAS TREE FITTINGS

(Compared with flanged fittings)

Weigh a great deal less . . . have a substantially higher safety factor . . . and are easier on your pocketbook.

THORNHILL-CRAVER COMPANY
HOUSTON

Reconditioned used pipe is being used for the new work. Mayes Brothers Corp. of Houston, has the contract for wrapping the pipe. The old gas line will be tested and any needed repairs will be made.

Texas Pipe Line Moves Oil Through New Line

Texas Co. is receiving approximately 20,000 bbl. of oil daily from Louisiana through the recently completed sections of the new line of Texas Pipe Line Co. to the terminal at Port Neches, Tex. The carrier is a 10-in. line from Port Neches to the Pilien station near New Iberia, coastal Louisiana, and 8-in. from there to Paradis field, St. Charles Parish. The line also will serve the Lafitte, Paradis, Erath and Bateman Lake pools in South Louisiana. The line has a daily capacity of 42,000 bbl. and was constructed with used equipment.

West Texas Shipments of Texas Co., Humble Changed

The Texas Co. has reduced its purchases in West Texas and New Mexico 50 per cent, the second company to impose pipe-line proration on the Permian basin. During February, Humble Oil & Refining Co. purchased only 88 per cent of the allowable production in West Texas excepting the Yates and World pools. Effective March 1, Humble raised its takings to 95 per cent.

The 50 per cent reduction of purchase by Texas Co. applies to all pools in which the company is a purchaser in the basin and the greater part of New Mexico.

Wisconsin Senate Passes Bill Obstructing Gas Lines

MADISON, Wis.—A bill to obstruct introduction of natural gas in Wisconsin was adopted by the Wisconsin Senate March 4, 30 to 3.

The measure, by the committee on state and local government at the request of Sen. Bernhard Gettelman, Milwaukee, not only requires approval of natural-gas introduction by the state Public Service Commission but permits the governing bodies of municipalities to determine whether or not it shall be made available to their citizens.

Sen. Milton T. Murray, Milwaukee Republican, one of three who voted against the bill, charged it was a preventive rather than a regulatory measure. He declared natural gas would effect savings for consumers and objected that no other public utilities are requested to obtain permission from city councils to operate within municipalities.

WHEATLEY

PUMPS

DUPLEX

2½" to 4" x 6" V-Belt or Direct
46 BPH at 1120 lbs.
125 BPH at 417 lbs.

3" to 6" x 6" V-Belt or Direct
68 BPH at 767 lbs.
288 BPH at 181 lbs.

2½" to 5" x 10" Direct Drive
59 BPH at 1325 lbs.
278 BPH at 330 lbs.

2½" to 7" x 10" Direct Drive
92 BPH at 920 lbs.
557 BPH at 168 lbs.

2½" to 5" x 10" V-Belt
59 BPH at 1400 lbs.
278 BPH at 405 lbs.

3" to 7" x 10" V-Belt
92 BPH at 1203 lbs.
557 BPH at 202 lbs.

2½" to 7" x 10" V-Belt
92 BPH at 1400 lbs.
557 BPH at 303 lbs.

3" to 8" x 10" V-Belt
92 BPH at 1400 lbs.
733 BPH at 230 lbs.

TRIPLEX

3" to 5¾" x 8" V-Belt Drive
156 BPH at 1605 lbs.
631 BPH at 396 lbs.

QUINTUPLEX

2½" to 4" x 6" V-Belt
199 BPH at 1500 lbs.
555 BPH at 600 lbs.

3" to 5¾" x 8" V-Belt
260 BPH at 1605 lbs.
1050 BPH at 396 lbs.

CHECK VALVES

Full Pipe Opening Horizontal Swing
Standard Bronzed Trim
2" to 24"—Series 15-30-40-60
FBE-SBE—FOE & SOE
SYNTHETIC RUBBER SEAL
2" to 24"—Series 15-30-40-60
FBE-SBE—FOE & SOE

GATE VALVES

2" to 12"—Series 30-40-60
Rack Type — Self Cleaning Disc. Has Teeth and Rides a Rack Cast in Valve Body. Cleans each operation — never freezes — easier to operate.

TWIN VALVES

2" to 12"—Series 30-40-60
Flanged Both Ends
Rack Type: Gate and Check Together

LIQUID SEAL EQUALIZER

Heavy Liquid is Used As a Piston Between Air in Chamber and Liquid Being Pumped — Air Can't Contact Liquid Being Pumped—Nothing Wears Nothing To Be Replaced — Any Size

STRAINERS

GASOLINE or CRUDE OIL
Single or Twin
Line Type or Streamlined

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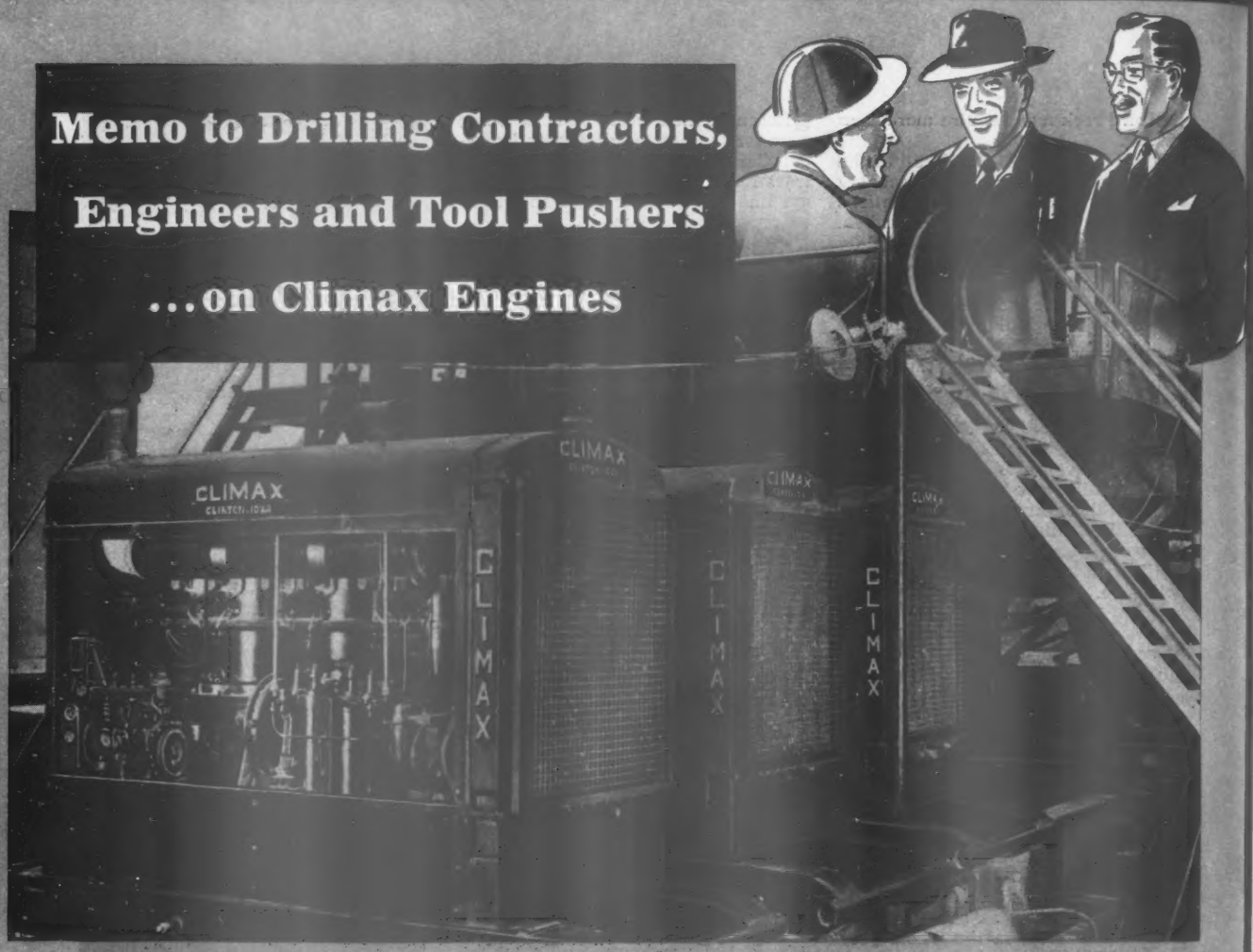

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Exploration and Drilling

Week's Highlights

THE effect of increasing production on the productivity of oil fields is well demonstrated by a comparison of the reports of the Kansas Corporation Commission showing production for January 1943 and January 1942. In January 1942, there were 244 fields on proration while a year later there were only 219, including 19 new fields. Some of the 44 fields missing from the later report have been merged with others but 30 have gone off proration. There was an increase of 525 producing wells during the year but there were 6 fewer in prorated fields. While production has risen from 230,000 bbl. to 280,000 bbl. the productivity of the prorated wells has fallen from 8,153,166 bbl. to 7,305,042 bbl., a drop of more than 10 per cent. Productivity is reckoned on the basis of drawdown tests and does not indicate actual potential so that the drop of 10 per cent in productivity probably means a greater decline in the amount of oil which could actually be produced.

Last January 162 fields produced less than their allowable, compared with 155 in January 1942 but the deficiency had increased from 347,507 bbl. to 759,348 bbl. Many of these fields are one-well pools without pipeline connection but the majority are on steady production. Last January there were 22 multiwell pools in which every lease failed to make its allowable, the total shortage being 93,497 bbl. This contrasts with 24 similar fields in January 1942 with a shortage of only 32,115 bbl.

This year 47 pools made more than their allowable production in January while in 1942 89 fields made more than their allowables.

These statistics bear out the expressed fears of many Kansas operators that the state is producing more oil than sound production methods justify. This overproduction is necessitated by declining production over the whole of the northern Mid-Continent and eastern regions. Without important discoveries, increasing demand can only be met by stepping up production in older fields. This, if continued far enough, will impair the reserves in those fields and the process will continue in more remote districts until there is a nation-wide shortage.

SOUTHWEST TEXAS: A Karnes County wildcat has opened a new field about 5 miles southeast of Kenedy. The well is producing from the Reklaw sand series. Increased activity is expected to follow the Starr County discovery, which was completed in the Ulrich wildcat sand (p. 90).

PERMIAN BASIN: A Crockett County wildcat which showed 30 bbl. of oil on a 2-hour swab test has been plugged back for a further test of the pay zone. Testing is under way at a prospective southern extension to the Fullerton pool, Andrews County (p. 91).

TEXAS GULF COAST: Testing is still under way at a prospective discovery in Waller County. It is reported to be recovering large gas flows with a small spray of distillate (p. 90).

ROCKY MOUNTAIN AREA: The north dome of the Oregon Basin field has been extended to the west and a test northwest of a recent Tensleep discovery in Elk Basin was reported to have encountered good saturation in the Tensleep. A test of an old Utah wildcat drilled last fall proved unsuccessful and additional wells will be drilled nearby to determine the extent of oil showings found in the well (p. 94).

WEST CENTRAL TEXAS: An Ellenburger lime project in north-central Stephens County has recovered saturation in the Caddo lime which showed 250 ft. of oil-cut mud on a 10-minute drill-stem test (p. 95).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended March 6, 1943)

	Oil	Gas	Dry	Total	Footage	Comp. to date 1943	Comp. to date 1942
N. Y., Pa., and W. Va.	44	12	2	58	166,454	513	696
Ohio	3	9	5	17	48,484	124	181
Indiana	1	0	2	3	8,318	46	61
Kentucky	0	1	1	2	4,117	37	49
Illinois	28	1	12	41	103,649	322	354
Michigan	3	0	3	6	17,161	66	131
Kansas	13	0	12	25	80,406	227	300
Nebraska	0	0	0	0	0	3	9
Missouri, Iowa	0	0	0	0	0	2	2
Oklahoma	9	4	6	19	68,297	189	293
Texas:							
North Central Texas	9	0	15	24	62,810	197	291
West Texas	9	0	4	13	45,088	150	376
Texas Panhandle	2	0	0	2	6,125	33	119
Eastern Texas	1	2	2	5	27,678	44	92
Texas Gulf Coast	4	0	1	5	27,843	65	173
Southwest Texas	7	1	12	20	96,966	150	254
Total Texas	32	3	34	69	266,510	639	1,305
North Louisiana	3	1	4	8	32,927	55	115
Louisiana Gulf Coast	2	0	2	4	29,583	56	116
Total Louisiana	5	1	6	12	62,510	111	231
Arkansas	4	0	3	7	49,364	38	27
Mississippi and Southeast	1	0	3	4	24,976	8	12
Montana	3	0	1	3	8,771	26	28
Wyoming	3	0	0	3	6,725	23	15
Colorado, Utah	0	0	0	0	0	1	4
New Mexico	3	0	1	4	15,704	33	49
California	11	0	6	17	57,733	169	194
Total United States	163	31	97	291	986,179	2,577	3,941
Total previous week	184	26	91	301			
Week ended March 7, 1942	212	34	112	358			

Geologic Background of Oil Production In the Illinois Basin

by B. F. Hake

MOST of southern Illinois and the adjacent western parts of Indiana and Kentucky are today occupied by a structural depression referred to as the Eastern Interior Coal Basin or the Illinois basin. It is an area which has been repeatedly depressed during the geologic ages so that marine waters periodically covered the area, depositing shales, sands and limestones, with large quantities of organic matter, parts of which have been converted into oil and coal. Thus its persistent tendency to sink is the fundamental reason why this district now contains numerous accumulations of both oil and coal.

Because the sinking was intermittent by small increments, and the process was occasionally reversed, the sediments deposited in the basin during any one geologic episode are comparatively thin; the total is not very great; and some parts of geologic time are not represented by sediments. The sinking process was not uniform nor apparently systematic; some areas sunk considerably farther than others, and some localities experienced actual uplift while other parts of the basin continued to sink. These complex differential movements influenced the distribution, character and structural attitudes of the strata; which features in turn regulated the manner and limited the localities in which oil could accumulate.

Geologic Background

The geologic background of the picture of oil production in the Illinois basin may perhaps be presented most satisfactorily by briefly reviewing the geologic history of the area; noting how the salient events produced modifications in the rocks in which oil was generated and stored, and in the physical conditions which limited its generation, migration and accumulation.

Ordovician Period

The oldest rocks in the basin which are now considered as potential oil producers are of Ordovician age, a period supposed to have begun about 450 million years ago and to have lasted about 70 million years. In the deeper parts of the basin these rocks lie between depths of approximately 7,000 and 9,500 ft. The submergence which resulted in the deposition of the Knox dolomite, the emergence indicated by the nature and distribution of the St. Peter sand, and the resubmergence recorded by the Upper Ordovician marine limestones are effects of regional earth movements which occurred before the Illinois basin and it neighbors, the Michigan and Appalachian basins, had become sharply defined geologic provinces.

The Knox and St. Peter are not commercially productive of oil in the Illinois basin, although rocks of equivalent age are important producers elsewhere. The Trenton limestone of Ordovician age has yielded oil in several localities in Illinois, but production from it to date amounts to less than 1 per cent of the oil production of the basin. In the past, Trenton wells have commonly been rather small producers, but in a recently discovered field, new completions have responded to acid treatment by showing initial capacities of 500 to 1,000 bbl. per day: an event which has materially stimulated prospecting of the Trenton in western Illinois.

Silurian Period

Major earth movements during Silurian time (a span of perhaps 30 million years) produced two deep and almost landlocked basins in the areas of Michigan and of New York and Pennsylvania. The marine waters in these isolated areas became highly concentrated brines, and great thicknesses of salt and other chemically precipitated sediments accumulated there. The Illinois region, however, was not so affected. It remained the site of a normal type of sea which was part of an extensive marine inundation of the central part of the continent. During this period about 500 ft. of marine limestones accumulated. For some reason Silurian rocks have not yielded outstanding quantities of oil anywhere in North America, and the few known oil occurrences in them in the Illinois district are of no commercial importance.

Devonian Period

Earth movements which occurred during the Devonian time (about 50 million years) had a more pronounced effect in the Illinois basin, which then undoubtedly received some of the features of its present configuration. Devonian rocks are chiefly limestones and have a maximum thickness of about 700 ft. They contain oil in eight important fields, and have yielded about 5 per cent of all the oil produced in the Illinois basin. The largest wells so far completed in the basin, some of which had initial capacities of more than 12,000 bbl. per day, produce from Devonian rocks. Before oil production ceases, many

DAILY AVERAGE PRODUCTION FOR WEEK

	Mar. 6 crude oil	Mar. PAW quota all oils	Feb. 27 crude oil
Arkansas	72,100	78,700	75,100
California	774,150	823,700	760,450
Colorado	6,440	7,000	6,000
Eastern fields	100,500	115,000	83,000
Illinois	230,000	262,300	242,500
Indiana	14,500	16,500	15,800
Kansas	299,100	309,900	306,400
Louisiana	340,100	349,800	336,350
North Louisiana	*89,500*		*89,800*
Louisiana Gulf Coast	*250,600*		*246,550*
Michigan	57,900	63,700	57,500
Mississippi	54,950	50,000	53,300
Montana	21,900	23,400	22,875
Nebraska	2,550	2,800	2,300
New Mexico	105,090	105,800	105,100
Oklahoma	342,300	390,700	350,450
Texas	1,392,250	1,502,000	1,351,450
East Texas	*323,400*	.....	*325,100*
West Texas	*213,000*	.....	*213,900*
North Central Texas	*135,200*	.....	*135,350*
East Central Texas	*99,800*	.....	*102,250*
Texas Panhandle	*88,600*	.....	*83,900*
Texas Gulf Coast	*459,600*	.....	*420,450*
Southwest Texas	*67,650*	.....	*65,500*
Texas Gulf Coast	*67,650*	.....	*65,500*
Wyoming	92,900	92,500	91,500
Total United States	3,906,370	4,193,800	3,860,075
Total production Jan. 1-Mar. 6, 1943			251,180,075 bbl.
Same period last year			266,723,040 bbl.

OIL WELL **LUCEY** SUPPLIES

DIESEL DRILLING EQUIPMENT

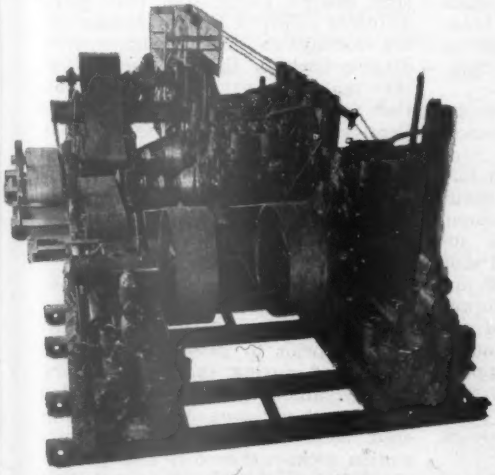
LUCEY
TYPE "ES"
SLIM HOLE
DRILLING OUTFIT

LUCEY SLIM HOLE DIESEL OUTFITS

Built in 4 sizes and capacities for drilling to the following depths with a liberal factor of safety.

TYPE "B"---------2,000 ft. to 3,000 ft.
TYPE "C"---------3,000 ft. to 4,000 ft.
TYPE "D"---------4,000 ft. to 5,000 ft.
TYPE "E"---------5,000 ft. to 7,500 ft.

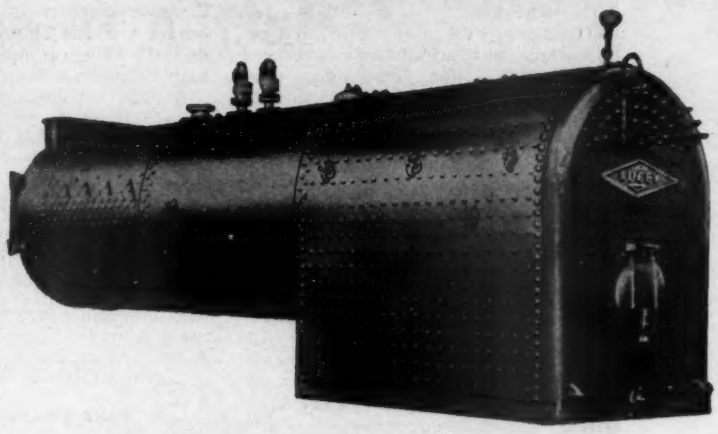
Any of the above outfits may be furnished with a Sand Reel if desired.



LUCEY 3-ENGINE DIESEL HOOK-UP

For Drilling to 12,000 ft. Outfit illustrated consists of three 300 H.P. Diesel Engines, a Wheland-Lucey B-7000-D Reverse Clutch and two Wheland-Lucey HP-15000-CE 7¼"x18" Power Pumps. Flexible arrangement permits easy changeover for compounding engines. Ample reserve power.

STEAM DRILLING EQUIPMENT



LUCEY HI-TENSILE STEEL OIL COUNTRY BOILER

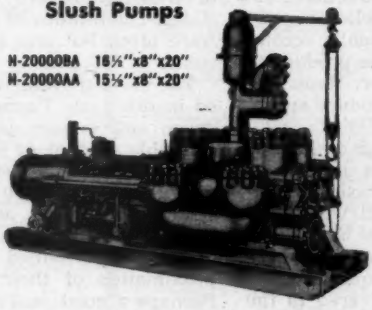
150 H.P., A.S.M.E. CODE, 250, 300 and 350 Lb. W.P.

The lightest weight boiler per horsepower on the market. Increased firebox dimensions 96"x60"x72" with corner radii of 12⅞" provides heating surface of 178 sq. ft. and furnace volume of 233 cu. ft. Total heating surface, firebox and tubes—1505 sq. ft. Greater burner space, together with large furnace volume, insures adequate combustion and permits firing at 200 to 300 percent of the API horsepower rating.

Welded firebox—no rivets to overheat or burn, no leaky seams. Space between crown sheet and outside wrapper 20". Short tubes (13'6") in vertical rows. Water space all around firebox—4". Good water circulation—water volume 2310 gal. Easy to clean.

WHELAND-LUCEY Duplex Steam Slush Pumps

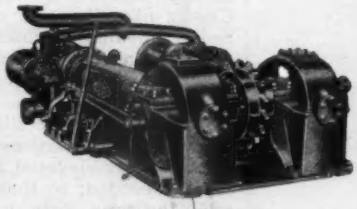
N-20000BA 18½"x8"x20"
N-20000AA 15½"x8"x20"



These pumps have self-draining steam end, with combined steam and exhaust valves located below the steam cylinders. As each stroke is completed, the exhaust steam must blow out the condensate. Incoming steam does not have to evaporate condensate. Result is improved thermal efficiency — better steam cushion — increased mean effective steam pressure—elimination of broken rings and cylinder heads—more mud—higher mud pressure—smoother operation—reduced steam consumption. Less fuel.

WHELAND-LUCEY GM-6000-B

12" x 12" Twin Cylinder Steam Drilling Engine



A powerful steam-saving engine equipped with efficient locomotive "monkey motion" valve action affording variable cut-off with constant lead of the piston type valves. Ideal for drilling or driving power slush pump. Crank and crossheads totally enclosed and run in bath of oil. Valve mechanism is easily accessible for adjustment or repair. Effortless reversing and easy to handle. Net weight 9,700 pounds.

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Tanks, Steel
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Tubes, Boiler
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Turbo Generators
Tongs
Tool Joints
Wire Rope

Devonian wells produce large volumes of salt water which give rise to troublesome and costly disposal problems. Brine has been satisfactorily disposed of in several fields by pumping it back underground into a porous stratum.

Near the close of the Devonian period (an event estimated to have been about 300 million years ago) areas around the Illinois basin emerged from the sea and were subjected to erosion so that the youngest Devonian sediments and the oldest Mississippian sediments in areas adjacent to the basin rest on the beveled edges of many older formations.

Mississippian Period

Renewed downwarp of the earth's crust caused the basin to be again extensively flooded with marine waters; and during the first 15 or 20 million years of the Mississippian period a thickness of some 1,400 ft. of strata accumulated, most of which was composed of limestones.

It is estimated that the Mississippian limestones have produced about 15 per cent of the total oil recovered from the Illinois basin. Although some oil is produced from lower strata of the Mississippian system, the most important production from limestones of that age is derived from the oolitic beds called the McClosky zone near the top of the limestone section. Some wells have produced from this zone at initial rates of more than 9,000 bbl. per day, and "thousand-barrel" wells are common. Rates of production from most McClosky wells decline rapidly and oil recovery is not usually accompanied or followed by the production of large amounts of water. Many McClosky oil wells never produce appreciable amounts of water.

During about the last 5 or 10 million years of Mississippian time (Chester epoch) the Illinois basin continued to sink and be filled with sediments, but the adjacent land areas became more elevated and were more rapidly eroded; so that quantities of mud and sand were delivered to the sea occupying the basin. The deepening of the basin by subsidence and the filling of the basin by sedimentation then proceeded at remarkably well balanced rates, so that at no time did the water in the Chester sea attain great depth.

The result of this general condition of delicate balance was the accumulation of a cyclic series of sediments, about 1,200 ft. thick and very heterogeneous in composition. The heterogeneity of the Chester series is partly responsible for the large number of small oil fields that have been found in the Illinois basin and for the extremely variable sand conditions that characterize most fields and cause oil men to say that "every well in the field is a wildcat."

Because the oils of the Chester are generally brown and of lower gravity whereas the oils of the underlying Mississippian limestones are commonly green and of higher gravity, many geologists believe that each series of rocks contains its own source of petroleum. It is possible that the shales, which make up a large fraction of the Chester, contained the organic matter from which Chester oil was formed and that the oil found in Mississippian limestones is indigenous there.

Chester oil wells often have initial capacities of more than 1,000 bbl. per day, and the production from these sands is expected to continue at low rates for many years. Chester sands are the chief sources of present and foreseeable oil production in the Illinois basin. They have contributed about 55 per cent of all the oil produced in the basin to date, and of this amount over 90 per cent has come from the lowest group of sands called Aux Vases, Benoist, Paint Creek and Cypress.

Pennsylvanian Period

Early in Pennsylvanian time (about 275 million years ago) the Illinois basin was lifted above the sea and the newly deposited marine sediments were deeply eroded; in some localities hundreds of feet of Mississippian strata were removed. The topography during that erosion interval was more rugged than the present one. Geologists studying subsurface conditions in oil fields have recognized parts of several canyons in that ancient surface with varying depths up to 400 ft. and on the walls of which there are extensive landslides. The hilltops of that topography were often flat and capped by limestone.

The earth movements which resulted in this early Pennsylvanian emergence and erosion produced a considerable amount of structural deformation of the sediments which occupied the basin. Most of the geologic structures serving as traps for accumulation of Mississippian and older oils then attained some close approximation of their present forms. Perhaps a good deal of the fluid migration which resulted in the known oil accumulations in Mississippian rocks took place during that episode of deformation. Probably also some oil escaped from the Mississippian rocks at that time and was lost.

The early Pennsylvanian epoch of uplift and erosion was followed by another marine inundation. During the early part of this event, the sea advanced eastward first converting the canyons into fiords, then filling them with mud and sand, and finally inundating the hilltops. Within what is geologically speaking a short time, the strand line advanced from somewhere west of the present course of the Mississippi River, at least as far eastward as the site of the present Appalachian Mountains. Sediments deposited during Pennsylvanian time in the Illinois basin attained a maximum thickness of more than 2,000 ft. The volumes of detritus then delivered to this region must have been about all that the waters of the area were capable of spreading in stratified forms; for ill sorting and sudden variations in thickness are outstanding characteristics of these Pennsylvanian sediments. Before the end of the Pottsville epoch of the Pennsylvanian, the region had been restored to a geographic condition similar to that which prevailed during the Chester; except that in Pennsylvanian time truly marine conditions were temporary, localized and intermittent. A large fraction of the Pennsylvanian rocks were deposited in embayments and lagoons, in swamps occupied by brackish or fresh water, or in deltas or flood plains of rivers. The geography of the Illinois basin at that time must have resembled parts of the coastal region of the Gulf of Mexico. This set of deposition conditions is responsible for the numerous coal seams among the Pennsylvanian strata of the basin.

Oil was abundant in Pennsylvanian rocks in the older fields of eastern Illinois. There it occurred in many sands throughout the Pottsville and part of the Carbondale formations—more widely distributed stratigraphically than elsewhere in the basin. This distribution may be due to the fact that in these fields the Chester rocks are very deeply eroded and the Pennsylvanian sediments overlap one another in various ways onto that eroded surface, so that many different sands of Pennsylvanian age are locally in direct contact with diverse parts of the Chester section, thus making a variety of opportunities for Chester oil to escape into Pennsylvanian sands. Elsewhere in the basin most of the oil found in Pennsylvanian rocks occurs either near the base or near the top of the Pottsville.

Old Fields

It has been estimated that the Pennsylvanian yielded about half of the oil produced from Illinois fields discovered prior to 1936; but in fields discovered during the past 6 years, Pennsylvanian rocks have yielded less than 1 per cent of the oil recovered. Wells producing from Pennsylvanian rocks are usually not spectacular. Commonly there is but little natural gas with the oil, and the wells generally do not flow. Because the sands are lenticular and separated one from another by shales, there is but little connection between the sands which contain the oil and sands at the outcrops of the formations. Hence there is little tendency for water to move into the oil sand when oil is withdrawn; and early in their productive lives, most wells decline until each produces only a few barrels per day by pumping. This phase of production, however, lasts a long time. In the Illinois basin there are many wells more than 20 years old

Yet STILL A SPANG INSPECTOR AT HEART

Half-way around the world, right in the thick of battle, Sergeant Bill Holmes still retains the keen eye for detail he acquired back home as an inspector of Spang Pipe. He still remembers Spang's high standards and quality.

Today, Bill is fighting for his country. —And Spang Pipe is fighting right along with him playing a vital role in the construction and operation of our ships, submarines, tanks and war plants.

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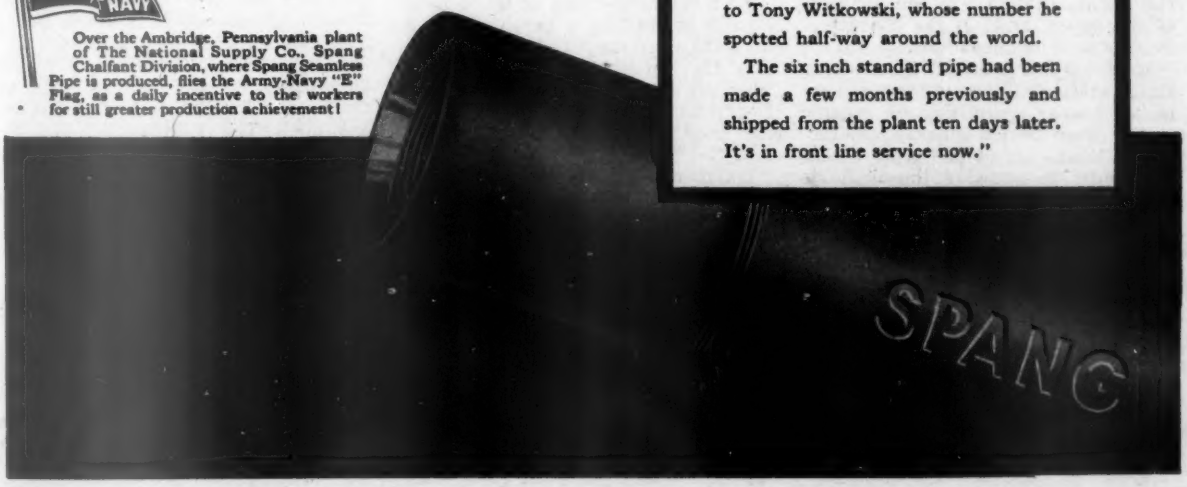
Over the Ambridge, Pennsylvania plant of The National Supply Co., Spang Chalfant Division, where Spang Seamless Pipe is produced, flies the Army-Navy "E" Flag, as a daily incentive to the workers for still greater production achievement!

The Story OF A SPANG INSPECTOR 7,000 miles FROM HOME

"Somewhere in the battleground of the far Pacific, a section of Spang Pipe reached its destination recently, where its name and inspector's number looked like a greeting from home to Marine Sergeant William Holmes. For Bill was a Spang inspector himself for several years, working in the bay next to Tony Witkowski, whose number he spotted half-way around the world.

The six inch standard pipe had been made a few months previously and shipped from the plant ten days later. It's in front line service now."



which still produce oil at profitable rates from the Pennsylvanian.

Post-Pennsylvanian Time

If any sediments younger than Pennsylvanian were ever deposited in the Illinois basin, they have been entirely removed by erosion or their insignificant remnants are concealed by the mantle of ill-assorted clays, sands, and gravels which was spread over much of the basin during the Glacial epoch.

Earth movements since Pennsylvanian time have deformed the strata of the Illinois basin but little. If the rocks could be stripped off so that a single horizon in the Pennsylvanian strata was everywhere uncovered, there would be revealed a gently undulating surface, over most parts of which one could travel without being conscious of slopes. Only in a few places would there be more local relief than there is in the present-day surface topography. This gentle warping is all of the deformation that has been suffered by the rocks of the Illinois basin during a span of time probably three times as long as that which was required to develop man from the most primitive anthropoid mammal.

Perhaps during that time some additional quantities of oil were added to the accumulations we are now exploiting. However a great many geologists believe that most of the oil present in any formation found its way there in a (geologically) short time after that formation was buried under later sediments. In the light of this belief it would seem that our present-day Illinois basin oil bodies have been substantially in their present conditions for about 200 million years.

Illinois Basin's Rank as an Oil Producer

Three factors in the histories of oil regions seem to have been dominant in determining the outstanding characteristics of the oil deposits within them. These are (1) the rates of marine sedimentation, (2) the textures of the strata, and (3) the characters of structural deformations.

Many of the great oil fields occur where marine sedimentation was rapid and large quantities of organic matter were buried quickly. California oil basins are of this type. Where sedimentation was slow the oil fields are generally less prolific, perhaps because there was excessive opportunity for destruction of organic matter before burial. Illinois seems to have been in the slow sedimentation class except during the Chester epoch when rates of deposition appear to have been over four times as rapid as in Devonian and Silurian times. The Chester has produced more oil than all the other rocks of the basin combined.

Widespread strata of uniformly porous character tend to promote regional migration of oil, possibly with consequent occurrences of large accumulations near their margins. The East Texas and the Cutbank, Mont., fields seem to be of this type. Where formations are heterogeneous in texture and porous strata are lenticular, a large number of effective oil traps exist; and pools are commonly small, though perhaps numerous and closely spaced. Western Illinois contains some extensive, uniform sands; and there the great Salem and Louden fields are located. In central and eastern Illinois the Chester sediments are more heterogeneous and numerous pools of moderate size occur, many of them in such close proximity that they form extensive composite oil fields.

Where the earth has been buckled into extremely large and simple folds, oil may accumulate in a few very prolific areas. Kettleman Hills in California and Turner Valley in Alberta, Canada, are typical examples of this. Illinois is in general an area of moderate to slight structural deformation. Its largest fold is the La Salle anticline where the old fields of Illinois were found, but even here structure is only partially responsible for the shapes and sizes of the oil bodies.

The basin's relative position as an oil province is perhaps clarified by a few comparative statistics. In 1941 the world produced about 2¼ billions of barrels of crude oil. Of this the United States produced about two-thirds, Illinois' contribution was just under 10 per cent of the total for the United States. Production figures on a per-acre basis provide illuminating qualitative comparisons, although they involve a considerable personal element and so cannot always be accepted at face value. On this basis the relative position of the State of Illinois is shown by the following approximate figures:

Petroleum Recovered to End 1942

Field and state—	State Aver., bbl./acre	Field
Porter, Michigan	2,500	4,650
Salem, Illinois	4,700	18,300
Oklahoma City, Oklahoma	6,900	38,100
Long Beach, California	29,000	424,000
*Bibi Eibat, Baku, Russia	550,000	750,000

*Estimate by B. B. Zavoico.

OKLAHOMA

Hughes County Wildcat Completed As Small Gasser

THREE wildcats were completed dry and one was finished as a gas well as the week ended. In the South Wetumka area of Hughes County, Creekmore-Rooney 1 Dannenburg, NW NW 35-9n-10e, gaged 6,000,000 cu. ft. of gas at 650 lb. rock pressure in a sand at 2,835-45 ft. It is about 3 miles east of the nearest gas field. The balance of the week's developments centered in proven areas.

At a recent meeting of the nomenclature committee, a number of new oil pools were named. Lake Shawnee was the name given Stanolind and Amerada's 1 Bleeker in NW SE SW 28-10n-2e. It was completed in Wilcox sand at 5,877-85 ft., flowing 347 bbl.

Oklahoma Gasoline Plants, Inc., 1 Potts, NW SE NW 9-18n-6e, 1½ miles southwest of Markham, was called the West Markham pool. The well has not been completed but was showing for a 125-bbl. producer in the Wilcox at 3,599 ft., total depth.

In Pottawatomie County, Continental and Kerlyn 1 Weaver, NW NE NE 32-8n-3e, was called the South McComb pool. It is 1 mile west and south of McComb pool and a mile south of the town by the same name. The 1 Weaver was completed in Hunton lime at 4,664-80 ft., with total depth of 5,451 ft. Initial potential was 616 bbl., flowing.

A number of other discoveries were held over pending recommendations of names from operators. Included in the group was Stanolind and Amerada 1 Ingham, Payne County Misener sand discovery.

Northern Ordnance Corp., a recent entry into the oil business, announced locations for two 6,000-ft. tests in western Oklahoma. Both are in Beckham County and are Carter Oil Co. farmouts. The 1 Crawford, NW SE 25-9n-22w, is east of the town of Carter and 7 miles east of the Sayre gas pool. The 1 Sides, SE NE 35-10n-23w, is east of the town of Sayre and north of the Sayre gas pool. Considerable interest has been shown in these proposed operations by Oklahoma oil companies.

OKLAHOMA COMPLETIONS

Wildcats

Haskell County: LeFlore 1 Wallace, NE SW NE 6-8n-21e, dry, T.D. 4,516 ft., sand 4,480 ft.

Hughes County: Creekmore-Rooney 1 Dannenburg, NW NW 35-9n-10e, 6,000,000 cu. ft. gas, Gilcrease 2,835-45 ft., 650 lb. R.P.

Kay County, W of Burbank pool: Alladin Pet. 1 Graham, SE SW NE 29-27n-3e,

(Continued on Page 99)

CALIFORNIA

Accumulation of Heavy Crude Found in Zaca Creek District

LOS ANGELES, Calif.—Tide Water Associated Oil Co. may have found a commercial accumulation of heavy crude oil in the Zaca Creek district of Santa Barbara County about 4 miles southeast of the Gato Ridge field, although it may take another well or two definitely to determine the importance of the district from a production standpoint. Tide Water Associated has been prospecting in this region for about a year and nearby General Petroleum Corp. has drilled two or three prospect holes during the past several months. Associated's discovery was made originally in 1 Davis several months ago but this proved to be a comparatively small well and it therefore remained for 1 Chamberlain in 33-8n-31w to focus the attention of operators on the area. The latter well was put on the beam several days ago and has been pumping around 175 bbl. per day from a shale body at 3,685-4,430 ft. The oil has a gravity of 12.5° A.P.I.

In the Lompoc area, A. E. Bell on a formation test of 6 Lompoc at 4,604-4,726 ft. recovered 1,056 ft. of gas-cut mud and a little heavy crude oil that tested 8° in gravity from a hard, brown shale. This result is somewhat like conditions prevailing in the Zaca Creek area as Tide Water Associated's small production was likewise from this brown shale body. In the Cat Canyon district, Standard Oil Co. is making a series of tests on 1 Basin-Lloyd in 15-9n-33w to ascertain the source of water that has prevented commercial production. This deep test is bottomed at 7,250 ft. Shell Oil Co., Inc., is just about ready to spud its Rincon wildcat in Ventura County after having been delayed several days by washed-out roads. This condition is faced every winter but was more pronounced this year due to increased wildcat drilling which almost always means the building of new roads that are not expected to be of a permanent nature.

COASTAL DISTRICT COMPLETIONS

Ciervo wildcat district, San Benito County: Union Oil Co. 1 Friedman, 13-16s-11e, abandoned as not commercially productive, T.D. 6,370 ft., formation test 3,560-5,003 ft., recovered 285 ft. mud and water; formation test 4,090-5,179 ft. recovered 5,000 cu. ft. gas, production test 3,850-6,006 ft. recovered 12,000 cu. ft. gas maximum.

Santa Maria, Santa Barbara County: Bell-Air Oil Co. 1 Williams-Cat Canyon, 25-9n-33w, abandoned as dry hole, T.D. 6,291 ft., Sisquoc 1,840 ft., middle Sisquoc 2,520 ft., middle Miocene 4,290 ft., Miocene brown shale 5,310 ft., siltstone and shell zone 6,195 ft., all zones tested showed salt or sulfur water.

SAN JOAQUIN VALLEY

Operators are not losing any time following up Standard's discovery in the Pleasant Valley-Guijarral Hills section of Fresno County. Further increase in drilling may be expected in the near future. All of the acreage is held in large blocks and this will automatically preclude close drilling. R. S. Lytle, who is operating for the Doheny interests, Honolulu Oil Corp. and Seaboard Oil Co., is building derrick for a well to be drilled in 20-20s-16e, which is north of Standard's discovery well, 82-29-F Pleasant Valley Farming, which is in 29-20s-16e. Standard is starting two additional wells on the discovery property, 62-29-F and 64-29-F, in 29-20s-16e and another in 21-20s-16e.

The Cantua Creek district of Fresno County will receive another going over in the near future as Richfield Oil Corp. is preparing to drill a test in the NW cor. of 14-17s-15e and Superior Oil Co. will drill a test in the center of 36-17s-15e. This will place the two wildcats about 3 miles apart in a northwest-southeast direction. In the meantime, Standard is finishing the derrick for a new well to be drilled in the Jacalitos district of Fresno County and an early spud is expected. This wildcat will be 61-35 and it will be drilled in 35-21s-15e. Wilshire-Annex Oil Co. proved up the existence of commercial production in the Jacalitos section last year and has drilled a number of fairly good wells since that time. Production at Jacalitos comes from the Temblor of Miocene age at comparatively shallow depths. Drilling progress is rapid and these 3,500-ft. wells can be drilled and completed in 3 weeks. In the Kingsburg district of Fresno County, Superior Oil Co. found the basement at 5,468 ft. in 1 White and has accordingly abandoned work. This wildcat was drilled in 29-16s-22e.

Texas Co. has extended the productive limits of the South Belridge field in Kern County by completing 1 Wrightson fee in 12-29s-21e pumping 40 bbl. of 13.6-gravity oil per day from Tulare oil sand of Pleistocene age. This outpost is located about ½ mile from nearest production and is not far from a deeper dry hole drilled in 1917. It is believed quite possible that this dry hole was looking for large production and did not make a test of the shallow zones now being produced in the South Belridge field. Since completing the first well on the Wrighston fee property, Texas Co. has started a second well on the same property. General Petroleum Corp. has shown considerable interest in the productive possibilities of the South Belridge field due to its extensive holdings and has already started several additional wells in 12-29s-21e and another in 3-29s-21e. Union Oil Co. has concluded drilling operations on 21-10 Hopkins fee in 10-29s-21e after deepening the hole from 1,198 ft. to Etchegoin oil sand at 1,786 ft.

The East and West Coalinga fields of Fresno County are showing increased activity due principally to enlarged drilling by Shell Oil Co., Inc., and Standard Oil Co. of California, both of which are pursuing an aggressive development program on property held for many years but which have not been fully developed. The U. S. Navy Department has mapped locations for eight new wells to be drilled in the Elk Hills field of Kern County, but in view of the fact that Congress recently held up a large appropriation for development of the Elk Hills Naval Reserve it is not known how soon actual work will get under way. These projected wells are located in Sections 1 and 2-31s-24e and 27 and 34-30s-24e. Under the agreement between Standard and the Navy Department, as the result of which the former turned over its fee holdings to the Navy Department, Standard agreed to develop the Elk Hills properties as desired and according to recommendations of the Navy Department.

SAN JOAQUIN VALLEY COMPLETIONS

Antelope Plains, Kern County: Texas Co. 74-6 Voight, 6-28s-20e, abandoned as dry hole, T.D. 3,012 ft., Antelope gas zone and underlying oil zone were barren at this location.

Belridge, South, Kern County: General Petroleum Corp. 36-12 Belridge, 12-29s-21e, pumped 76 bbl., 14.1-gravity, 3 per cent cut, T.D. 1,086 ft., perf. 892-1,085 ft., completed in Parkford zone of Pleistocene age.

E. A. Parkford, 6 Belridge, 12-29s-21e, pumped 96 bbl., 12.9-gravity, 2 per cent cut, T.D. 1,811 ft., P.B. 1,178 ft., 120-mesh perf. 926-1,025 ft., 1,065-85 ft., 1,095-1,130 ft., 1,160-77 ft., first oil sand 931 ft., base Tulare oil sand 1,183 ft., Etchegoin oil sand 1,488-94 ft., completed in Parkford zone of Pleistocene age.

Texas Co. 1 Wrightson fee, 12-29s-21e, pumped 41 bbl., 13.6-gravity, 5 per cent cut, T.D. 1,160 ft., P.B. 1,145 ft., gravel-packed perf. 1,077-1,145 ft., completed in Parkford zone of Pleistocene age.

Coalinga, West, Fresno County: Texas Co. 4-C Coalinga, 6-20s-15e, pumped 109 bbl., 17.7-gravity, 0.4 per cent cut, T.D. 2,293 ft., 40-mesh perf. 2,212-90 ft., completed in upper Coalinga zone of Pliocene age.

Elk Grove wildcat district, Sacramento County: D. D. Feldman, 1 unit plan, 8-7n-6e, abandoned in Cretaceous shale, T.D. 4,530 ft., no important showings logged.

Kern Front, Kern County: Ohio Oil Co. 14 Midway-Premier, 32-27s-27e, pumped 84 bbl. net, 13.8-gravity, 55 per cent cut, T.D. 2,801 ft., perf. 2,589-2,801 ft., M point 2,424 ft., N point 2,515 ft., Q point 2,590 ft., R point 2,633 ft., S point 2,730

(Continued on Page 100)

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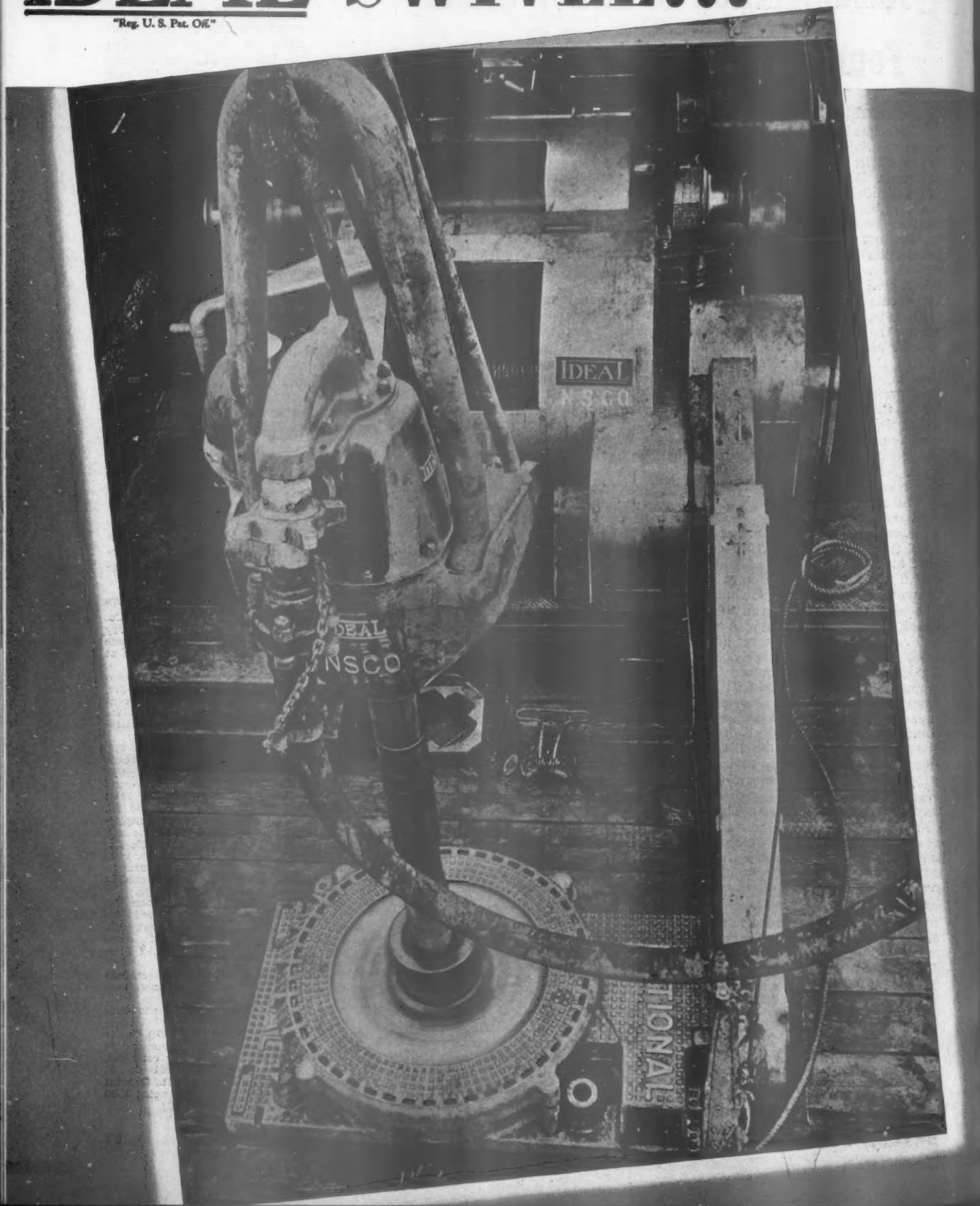

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TEXAS GULF COAST

Testing Continued at Waller County Wildcat

HOUSTON, Tex.—Testing was still under way as the week closed at Stanolind Oil & Gas Co. 1 G. T. Pattison, Waller County wildcat which may either open a new field or extend the big Katy gas-distillate pool. At total depth of 8,000 ft. and with perforations at 7,338-45 ft., the well underwent a 1-hour drill-stem test. With ⅜-in. choke at the bottom and ¼-in. choke at the top it flowed wet gas. Working pressure was 2,300 lb. in 15 minutes and 2,075 lb. at the end of the hour. Gas volume was at the rate of 2,900,000 cu. ft. a day. Thirty feet of distillate and 90 bbl. of brackish water were recovered. After 2-in. tubing had been swung at 7,345 ft. the well tested 3,300,000 cu. ft. of gas a day through ½-in. choke. Tubing pressure was 2,325 lb. Casing pressure was not gaged. Testing was continued.

Cities Service Oil Co. 1 Frank Stephens, new field opener in Colorado County 1 mile east of Ramsey was killed and cleaned out to 8,993 ft., the plugged-back depth. The crew then ran 2-in. tubing at 8,940 ft. on dual-completion packer and shut the well in.

J. S. Abercrombie and Magnolia Petroleum Co. B-1 McDonald, in the Old Ocean field of Brazoria County, was making steady progress toward its announced objective of becoming the deepest well in the world. Already around 14,350 ft., it was expected to continue drilling until it reaches 15,250 ft. unless it encounters serious mechanical difficulty. The deep-hole record now is held by Continental Oil Co.'s test in Kern County, California, which went to 15,004 ft.

W. Stewart Boyle and associates ran into trouble and are fishing for drill pipe at their 1 J. R. Budd, wildcat test a mile west of Cordelle, in Jackson County.

Phillips Petroleum Co. was at 7,702 ft. in sand and shale at its wildcat test, 1 Annie B. Renchie, in the Millican area of Brazos County. This is about the depth to which the test was expected to go when it was spudded last December. Plans for the future of the hole were not reported. Phillips brought in a gas well in this area, the 1 Mitchell, at 5,000 ft., establishing the prospect as a salt dome.

Standard Oil Co. of Texas was drilling in shale at 8,375 ft. at its Chambers County test, 1-136 State, 2 miles northwest of Smith's Point. It cored a sand section, but what it disclosed was not given out. It is planned to drill to about 10,000 ft. and then run an electrical survey.

TEXAS GULF COAST COMPLETIONS

Wildcats

Brazos County: Vee Tipt Oil Corp. 1 N. A. Stewart, 7 mi. SW of College Station, dry at 4,568 ft.

Fields

Barbers Hill, Chambers County: Texas Gulf Producing Co. 27-B Kirby Petroleum Co., H. Griffith Sur. A-12, O.W.W.O., old T.D. 5,198 ft., old P.B. T.D. 5,012 ft., cleaned hole to 4,990 ft., P.B. 4,910 ft., 243 bbl. through ¼-in. by 6-in. positive choke, T.P. 190 lb., C.P. 410 lb. (S.I.), gas-oil ratio 130, perf. 4,855-67 ft.

Dickinson, Galveston County: Frank W. Bennett 1 F. E. Repke, W. K. Wilson Sur. A-208, O.W.W.O., old T.D. 9,020 ft., new T.D. 9,073 ft., P.B. 8,750 ft., 38 bbl distillate and 2,250,000 cu ft. gas through 20/64-in. choke, T.P. 1,500-1,800 lb., perf. 8,352-60 ft.

Benoil Co. 2 Sam Levin, W. G. Banks Sur. A-36, O.W.W.O., old T.D. 8,100 ft., washed and P.B. 8,000 ft., 33 bbl. distillate and 2,500,000 cu. ft. gas through 24/64-in. positive choke at top, flowed 14,500,000 cu. ft. gas with open tubing at surface and ¼-in. choke at 5,000 ft., T.P. 775 lb., C.P. (S.I.) 1,625 lb.

Ganado, Jackson County: Texas 5 M. L. Hultquist, D. Dempsey Sur. A-363, 150 bbl. through ⅛-in. choke, T.P. 900 lb., gas-oil ratio 675, perf. 6,438-46 ft., T.D. 6,505 ft.

Harmon, Jackson County: W. Van Norman 1 W. W. McCrory, M. L. York Sur. A-313, 103 bbl. through ⅛-in. choke, T.P. 475 lb., C.P. 1,000 lb., gas-oil ratio 400, perf. 5,345-5,541½ ft., T.D. 5,403 ft.

Mayo, Jackson County: L. Crouch et al 1 J. Vesely, G. P. Aycock Sur. A-377, 33 bbl. through 3/32-in. choke, T.P. 915 lb., C.P. 1,430 lb., gas-oil ratio 5,939, perf. 5,419-22 ft., T.D. 5,600 ft.

West Ranch, Jackson County: Magnolia A-245 West Ranch, V. Garcia Sur., 121 bbl. through ⅛-in. choke, T.P. 725 lb., C.P. 960 lb., gas-oil ratio 196, perf. 5,760-64 ft., T.D. 5,767 ft.

SOUTHWEST TEXAS

Karnes County Wildcat Flowing From Reklaw Sand Series

CORPUS CHRISTI, Tex.—Seaboard Oil Co. 1 Julia Rzeppa, projected as a 6,000-ft. Wilcox test in mid-January, has opened a new field in the Erasmo Seguin Survey, 7 miles south of Falls City, Karnes County, marking the second new field for that county in 2 weeks. On its latest reported test the well was flowing at the rate of 198 bbl. through 5/32-in choke. Tubing pressure was 750 lb. and casing pressure 1,450 lb. The well was shut in, pending installation of storage. Total depth is 4,803 ft., plugged back to 4,012 ft., and production was coming from perforations at 4,000-10 ft., understood to be in the Reklaw.

The 1 Reasoner, Karnes County wildcat drilled by Phillips Petroleum Co. and Adams Oil & Gas Co., which opened the new Hondo Creek field 5 miles southeast of Kenedy, was completed at total depth of 8,160 ft., plugged back to 6,600 ft. Initial production was 132 bbl. through ¼-in. choke, with tubing pressure of 150 lb. and shut-in casing pressure of 850 lb. Perforations are at 6,582-90 ft.

The two strikes in Karnes County have started fresh activity in lease and royalty buying in that area.

Dirks Brothers 2 C. S. Page estate, 2½ miles south of Mineral, in Bee County, had revealed nothing conclusive as the week closed. It was at total depth of 7,893 ft., with perforations at 7,850-75 ft. A 15-minute drill-stem test, with packer set at 7,843 ft., showed 3-lb. working pressure. The packer broke at the end of 15 minutes. The test recovered 180 ft. of mud, with slight show of greasy oil and about 700 ft. of plain mud. Preparations under way for a squeeze job.

Transwestern Oil Co. was moving in material for 1 H. T. Sellers, 6½ miles south of Runge, in the Victor Blanco Survey, Karnes County.

T. E. Stephens 1 Gonzales heirs, 10 miles north of Roma, in Starr County, was showing for a producer. At total depth of 5,379 ft. and perforations at 4,496-4,520 ft., this wildcat began flowing oil and mud under pressure which built up to 1,700 lb. shut in. No gage of the flow was taken. The well was mudded in while a heavy christmas tree was being installed, after which it began making oil and mud again. It was expected to clean by the end of the week. On its 11-in. choke the well showed tubing pressure of 125 lb. and casing pressure of 350 lb.

Another wildcat showing for a producer in the South Texas area was Sun Oil Co. 4-A East, 8½ miles southeast of the Colorado field. At total depth of 4,736 ft. in sand this test was flowing at the rate of 43 bbl. through

5/32-in. choke, with tubing pressure of 50 lb. and shut-in casing pressure of 980 lb. Testing was being continued.

Highland Oil Co. has staked location for a wildcat test, the 1 I. Serma, in B.S.&F. Survey 523, Duval County.

LOWER GULF COAST COMPLETIONS

Wildcats

Karnes County: Phillips and Adams Oil & Gas Co. 1 C. L. V. Reasoner, Carlos Martinez Sur., 5 mi. SE of Kenedy, 132 bbl. through ¼-in. choke, T.P. 150 lb., C.P. (S.I.) 850 lb., perf. 6,582-90 ft., T.D. 8,160 ft., P.B. 6,600 ft., discovery, field named Hondo Creek.

Victoria County: Darby Petroleum Co. 1 A. J. Bankhead, 4½ mi. SE of Inez, dry at 7,016 ft.

Great Lakes Carbon Co. 1 Joe D. Wray, 6 mi. E of Inez, dry at 3,452 ft.

Fields

Midway, San Patricio County: Commercial Producing Co. 1 Scrivener & Ivey, S.A.&M.G.R.R. Sur. 6, A-153, dry at 6,137 ft.

Homer Easterwood et al 1 H. Josey, O.W. W.O., old T.D. 6,501 ft., dry at new T.D. 6,100 ft.

Odem, San Patricio County: Seaboard Oil Co. 7-C J. F. Welder, Juan Hart & Sons Sur. A-10, 141 bbl. through ⅛-in. choke, T.P. 725 lb., C.P. 900 lb., gas-oil ratio 391, perf. 5,392-96 ft., T.D. 6,766 ft.

Riverside, Nueces County: H. D. & H. O. Co. 2 Cullen C. Wright, V. L. de Herrera grant, 100,000,000 cu. ft. dry gas, open flow, S.I. pressure 1,650 lb., perf. 4,880-92 ft., T.D. 7,106 ft.

Yorktown, De Witt County: Adams Oil & Gas Co. 1 J. F. Pieper, G. H. Wood Sur. A-482, 288 bbl. distillate and 24,000,000 cu. ft. gas through ¾-in. choke, T.P. 1,075 lb., T.D. 9,100 ft.

SOUTH TEXAS COMPLETIONS

Wildcats

Duval County: H. J. Porter et al 1-A Mrs. J. Dunn estate, 8 mi. W of Realitos, dry at 4,515 ft.

G. W. Strake 1 Ira G. Yates estate, 4½ mi. NW of Fitzsimmons field, 8 bbl. oil and 450,000 cu. ft. gas through ¼-in. choke, perf. 3,168-72 ft., T.D. 4,010 ft., discovery, field named Strake.

Dan A. Auld 1 Alonzo Taylor, El Mesquite grant, dry at 4,009 ft.

Live Oak County: Continental 1-A George West estate, dry at 10,520 ft.

Stanolind 1 B. V. Matheson, 7 mi. NE of Mount Lucas, dry at 4,400 ft.

McMullen County: V. G. Schimmel Co. 1 Atkinson estate, C. P. Wright Sur., dry at 3,042 ft.

J. W. Gorman 3 Mrs. Ella Atkinson, 4 mi. NW of South Campana field, dry at 2,241 ft.

Zapata County: Government Wells Oil Co. 1 R. Hinnant, 2 mi. W of Mirando Valley field, dry at 2,670 ft.

Fields

Ulrich, Starr County: Gulfshore Oil Co. 1 M. M. Garcia, Josefe Benevides Porcion 91, 80 bbl. through ⅛-in. choke, T.P. 450 lb., C. P. 1,250 lb., gas-oil ratio 452, perf. 3,972-78 ft., T.D. 3,997 ft.

Colorado, Jim Hogg County: Humble 2-D T. T. East, O.W.W.O., old T.D. 3,272 ft., new T.D. 3,212 ft., 12.6 bbl., pumping

Driscoll, Duval County: Continental 11-B Clara Driscoll, U. Lott Sur. 484, A-900, 279 bbl. through ¼-in. choke, T.P. 245 lb., C.P. 1,020 lb., gas-oil ratio 164, perf. 2,945-70 ft., T.D. 2,971 ft.

Kohler, Duval County: Ogden & Voyles 1 Richardson, C.B.&C.N.G.R.R. Sur. 3, A-668, dry at 2,957 ft.

Lykes, Webb County: Magnolia 3 D.C.R.C. Lge. 4, Zapata County School Land Lge. 4 A-1916, dry at 2,070 ft.

White Creek, Live Oak County: Buckaloo Co. 1 A. Neehaur, B.S.&F. Sur., jetting 62 bbl. oil and 300 bbl. salt water, T.D. 1,827 ft.

PERMIAN BASIN, PANHANDLE

New Oil Field in Prospect Northeast of Live Oak Pool

MIDLAND, Tex.—John I. Moore and P. D. Moore has plugged back to 2,398 ft. from T.D. 2,567 ft. at their 1-12 Shannon, NW NW Section 12, Block FF, Crockett County wildcat 2½ miles northeast of the lone Live Oak pool producer, and shot with 80 qt. the pay which showed good possibilities of producing in commercial quantities. Pay was drilled from 2,377-98 ft., the hole filling 975 ft. in 5½ hours, and a 2-hour swabbing test recovered 30 bbl. oil. At latest reports operators were drilling out the Calseal tamp. Same operators were drilling below 2,369 ft. on their 1-21 Shannon, SW SW Section 21, Block YZ, and 2 miles south, their deep test had progressed below 6,470 ft. in shale.

In Andrews County, testing was under way on the south extension to the Fullerton pool, Fullerton Oil 4-A Wilson, which had been treated with 8,000 gal. acid at T.D. 7,110 ft. It had topped porous zone at 6,745 ft. One-half mile south of this test, Fullerton has made location for 1 University, NE NE Section 6, Block 13, University Survey, and Ohio Oil entered the area with its 1 University, NW NW Section 5, Block 13, University Survey, to start March 20. In the Mascho pool of southern Andrews County, Magnolia 1-15 University found the Fullerton pay barren in drilling to T.D. 7,627 ft. and were plugging back to test the San Andres zone above 4,605 ft.

In Borden County, Cosden Petroleum Corp. 1 Anderson, SE SW Section 57, Block 25, H.&T.C. Ry., southeast part of the county, was drilling below 3,620 ft. in lime. Six miles south of this test, in Howard County, W. S. Guthrie 1 Allen, Section 57, Block 20, Lavaca Navigation Co. Survey, had set 8⅝-in. casing at T.D. 2,156 ft.

An interesting wildcat was staked last week 1¾ miles northeast of nearest Ordovician production in the Apco-Warner pool of Pecos County at Anderson-Prichard and Magnolia 1 State-Powell, E¼ S¼ Section 96, Block 10, H.&G.N. Survey. It is separated from producers in the field by two dry holes. No shows have been reported in Magnolia 1-29 Eaton, 6 miles southwest of Imperial, which cored from 7,171-81 ft. and 7,181-96 ft., T.D., recovering 10 ft. green shale. It is believed to be in the McKee section which produces in the Abell pool. In the Abell pool, Skelly Oil 1 Spears was acidized after perforating casing from 5,897-5,906 ft., and was cleaning out.

In Sterling County, Ohio Oil 1 Clark, NE SW Section 6, Block 3, R. R. Wade Survey, southeast part of the county, was bottomed at T.D. 8,486 ft. where a strong odor of sulfur was found in porous lime, and the test was plugged back to 7,875 ft. where a drill-stem test will be run testing the Ellenburger topped at 7,705 ft. In the northwest part of the county, Col-Tex Refining 1 Reed was drilling below 8,335 ft.

In Winkler County, Magnolia 20 State-Walton, east of the Kermit pool, topped Simpson at 9,460 ft. and was drilling lime at 9,585 ft. Shell Oil 1 Blue, eastern part of the county, was drilling below 9,330 ft. in lime.

The Yoakum County wildcat being drilled by Barnsdall Oil 6 miles northeast of Plains was drilling below 6,880 ft. in dolomite with no shows reported.

Mile outpost for the Barnhart pool of southeast Reagan County was staked last week, 1,986 ft. from W, 1,966 ft. from N lines Section 5, H.E. &W.T. Ry. Survey. It is Amerada 1 Mary Johnson, and is exactly a mile northwest of the discovery well. All previous wells in the Barnhart pool have been drilled on land owned by the University of Texas.

WEST TEXAS COMPLETIONS

Wildcats

Andrews County: DeKalb Agric. Assn. 1-Means Est., SW SW Sec. 13, Blk. A-45, P.S.L., elev. 2,175 ft., Yates 3,230 ft., FQG 3,340 ft., San Andres lime 4,856 ft., show oil, dry, T.D. 4,965 ft. dolomite.

Fields

Abell Permian, Pecos County: Texas Co. 2 H. J. Eaton, 330 ft. from NE, 990 ft. from SE Sec. 17, Blk. 2, H.&T.C., elev. 2,372 ft., pumped 32 bbl. and 77 per cent water, 31 gravity, pay 2,309 ft, P.B. to 2,335 ft. from T.D. 2,350 ft.

Apco-Warner, Pecos County: Thompson-Carr 3 Gregg-Botsford, SE NW Sec. 101, Blk. 10, H.&T.C., elev. 2,446 ft., Ellenburger 4,545 ft., flowed 813 bbl., pay 4,545-4,725 ft., T.D.

Estes, Ward County: Gulf 2 E. W. Estes, O.W.D.D. from O.T.D. 2,928 ft., elev. 2,618 ft., 990 ft. from NE, 330 ft. from SE Sec. 38, Blk. 34, H.&T.C., flowed 69 bbl. gas lift, 33.2 gravity, pay 3,003 ft., N.T.D. 3,081 ft.

Henderson, Winkler County: Johnson & Wahlenmaier 7 Fred Leck, NW NW NE Sec. 3, Blk. 26, P.S.L., elev. 2,872 ft., brown lime 2,695 ft., dry, T.D. 3,179 ft.

Keystone-Colby, Winkler County: Skelly 1 S. Campbell, 554 ft., from N and W Sec. 29, Blk. B-3, P.S.L., flowed 176 bbl., elev. 2,892 ft., pay 3,162-3,341 ft., T.D.

(Continued on Page 100)

APPALACHIAN FIELDS

Development in Eastern Gas Fields Shows Increase

PITTSBURGH, Pa.—The number of new locations in the lower eastern fields is increasing but mostly in gas areas. Little new work to increase oil production is apparent. In West Virginia during the week, there was a good gas well in the Oriskany field in Jackson County. In Southeast Ohio there was a large gas well in Morgan County and a fair oil well in Perry County. During the week, 23 completions were reported of which 4 were dry, 14 gas wells and 5 oil producers with a daily initial of 90 bbl.

SOUTHWEST PENNSYLVANIA

On Laurel Ridge in Ligonier Township, Westmoreland County, New Penn Development Co. et al are hauling in casing to case 1 John and Eleanor Beck. The depth of this test is 7,276 ft. and after the hole was surveyed, it was found considerably off vertical. Casing may permit the completion to the lower Devonian.

On Chestnut Ridge in South Union Township, Fayette County, New Penn Development Co., Wm. E. Snee et al are drilling at 7,111 ft. in brown shale and the hole is caving. Here, Peoples Natural Gas Co. has again cemented 1 Walters back to 6,775 ft. and will drill out as soon as new tools arrive.

In Maryland, Wm. E. Snee et al are drilling at 6,763 ft. in 1 Speicher on the Accident Dome in Garrett County, and the formation is dark brown shale. There have been some alternate streaks of brown and gray shale above this.

SW PENNSYLVANIA COMPLETIONS

Armstrong County, Kiskiminitas Township: Chestnut Ridge Oil & Gas Co. 1 Park Rupert, 32,700 cu. ft. gas before shot, Bradford sand 3,438-66 ft., gas 3,438-66 ft., T.D. 3,580 ft.

Madison Township: Hanley & Bird 1 John Gregg, dry through Bradford sand, T.D 3,218 ft., small show of gas only.

Fayette County, Springfield Township: Barnesville Development Co. 1 Julius Spector, 179,000 cu. ft. gas, Fifty Foot sand 1,852 ft., gas 1,880 ft., R.P. 68 lb., 16 hr., T.D. 1,935 ft.

Westmoreland County, Bell Township: Peoples Natural Gas Co. 1 H. C. Hicks Coal Co. 6,200 cu. ft. gas, sand 3,247-3,330 ft., gas 3,263 ft., T.D. 3,455 ft.

WEST VIRGINIA

That there will be additional deep wildcats in West Virginia as soon as roads are passable in the outlying districts is a certainty. There will be continued activity in dormant areas as in Raleigh and Wyoming counties where activity has increased. All, however, are primarily for gas or in gas areas. The potential of the Oriskany fields in Kanawha and Jackson counties is declining as billions of feet of gas have been taken from these fields. There are rumors of a modified M-68 being prepared at the present time yet as long as bureaucratic paper work and maps are required and spacing orders require exceptions, little may be expected in new oil development as independent operators seem loath to bother with it and the independents are leaders in new extensions. The price ceiling still is unattractive for wildcatting.

WEST VIRGINIA COMPLETIONS

Boone County, Crook district: South Penn Natural Gas Co. 2 Minnie White, 5 bbl. and 300,000 cu. ft. gas, Berea, T.D. 2,969 ft.

Peytona district: United Carbon Co. 8

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Siler Coal Land Co., 211,000 cu. ft. gas, Big lime 1,462 ft., Berea 2,172 ft., T.D. 2,349 ft.

Sherman district: Pure Oil Co. 294 Williams Coal Co., 24 bbl., Berea.

Clay County, Buffalo district: Pittsburgh & West Virginia Coal Co. 7898 Elk River C. & L. Co., 457,000 cu. ft. gas, elevation 1,309 ft., Big lime 1,984-2,080 ft., Injun 2,080-2,176 ft., T.D. 2,192 ft.

Gilmer County, De Kalb district: Clem S. Morris et al 2 W. F. Roberts, ¼ bbl., Injun sand, T.D. 2,100 ft.

Kanawha County, Big Sandy district: Buff Lick O. & G. Co. 1 E. M. Young, drilled deeper, 152,000 cu. ft. gas, Berea 2,055-65 ft., T.D. 2,095 ft.

Upshur County, Buckhannon district: Pittsburg & West Virginia Gas Co. 7905 G. W. Grose, 57,782 cu. ft. gas, Gordon sand, T.D. 2,778 ft.

Meade district: Pittsburgh & West Virginia Gas Co. 7903 Hannah M. Swecker, 47,188 cu. ft. gas, Benson sand, T.D. 4,106 ft.

Wood County, Lubeck district: South Penn Natural Gas Co. 1 W. R. Bigelow, dry through Berea sand, T.D. 1,867 ft.

ORISKANY GAS FIELDS

Jackson County, Ripley district: United Carbon Co. 1087 Elizabeth W. Perkins, 5,406,000 cu. ft., Corniferous lime 5,228-5,333 ft., Oriskany 5,333-5,371 ft., shot 5,339-69 ft., R.P. 1,470 lb. 24 hr., T.D. 5,377 ft.

Washington district: United Fuel Gas Co. 5143 B. M. Pfost, 10,067,000 cu. ft. gas, Corniferous lime 5,103 ft., Oriskany 5,222 ft., gas 5,222-34 ft., not shot, T.D. 5,234 ft.

United Fuel Gas Co. 5123 J. R. Southal, 462,000 cu. ft. gas, Corniferous lime 5,038 ft., Oriskany 5,143-88 ft., gas 5,144-46 ft., not shot account lost in sand, T.D. 5,204 ft.

MICHIGAN

Development Under Way Near Osceola Discovery

SAGINAW, Mich.—Ohio Oil Co.'s Cedar Township discovery in Osceola County has launched Michigan's first drilling boom of 1943 with seven drilling permits already issued for additional explorations in Sections 27 and 28 in the immediate vicinity of the productive wildcat, half way between the Reed City and Evart fields.

Five of the permits were issued by the state Conservation Department to Ohio Oil and the other three to Sun Oil Co. These companies control most of the acreage in the area.

Also focusing interest on that part of the state was the completion of the biggest producer in months in the Evart field where Sun Oil Co. 2 Wickerham in Section 28 of Osceola Township produced 850 bbl. naturally in 14 hours to rate as the best well of the week in a list of seven Michigan completions.

Permits issued this year increased to 61 last week as a total of 14 were approved by the state. Aside from the wildcat section, they were divided one to a county for locations in Neyago, Gladwin, Bay, Lapeer, Barry and Clare.

Gulf Refining Co. continued development of the Bay-Kawkawlin field completing an 80-bbl. producer and in Van Buren's Geneva Township a wildcat was brought in for 50 bbl. on pump. Effects of the big Evart producer were dampened a bit, however, when Sun's B-1 Rohrer in Section 26 was dry.

Little value was placed on an oil show obtained in an Ottawa County wildcat, 3½ miles east of Holland. From 500 to 600 ft. of oil, with water, was reported in the hole, but dry holes had been drilled previous all around it.

In announcing last week's drilling permits, F. R. Frye, state oil engineer, reported the total issued since September 1927, when the law requiring permits for drilling went into effect, has passed 10,000.

MICHIGAN COMPLETIONS

Bay County, Kawkawlin Township: Gulf Refining Co. 1 Pajot, C S½ SE SE 28-15n-4e, pumping 80 bbl. acidized, T.D. 2,935 ft.

Gratiot County, Lafayette Township: Rex Oil & Gas Co. 1 Oakes, C NE SE 10-11n-1w, wildcat test, dry, T.D. 3,298 ft.

Osceola County, Osceola Township: Sun Oil Co. 2 Wickerham et al, C N½ SE NE 28-18n-8w, 850 bbl. first 14 hr., T.D. 3,737 ft.

Sun Oil Co. B-1 Rohrer et al, C N½ SE NW Sec. 26, dry hole, T.D. 3,720 ft.

Van Buren County, Geneva Township: William H. Clock 1 Marr, SW SW SE 24-1s-16w, wildcat, pumping 50 bbl., T.D. 1,071 ft.

Pine Grove Township: Michigan Devonian Petroleum Co. 1 Simons, C W½ NE NE 16-1s-13w, wildcat test, dry, T.D. 1,400 ft.

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ROCKY MOUNTAIN

North Dome of Oregon Basin Field Extended Westward

DENVER, Colo.—Another extension of the developed area on the west side of the north dome in the Oregon Basin field was chalked up this week in the Ohio Oil Co. 6 Custer Petroleum, NE NE SE 31-52n-100w, which pumped 350 bbl. per day from the Embar at 3,586 ft., total depth. It is a west offset to the same company's 5 Custer Petroleum which was completed last month for 400 bbl. per day. The well is on the upthrow side of a fault extending across the field from the northeast in Section 28 to the southwest in 6-51-100. Very little development had taken place to the north of this fault prior to the inauguration of the present drilling campaign which began 2 years ago. Since then 11 wells have been drilled, all of which were good producers. The location of these wells were widely spaced and indicate that at least 1,600 acres north of the fault will be productive. The new well is approximately 8 miles north of the most southerly producer in the field.

The Notches black oil field in Natrona County, Wyoming, southwest of Salt Creek, which was shut in from 1927 to the fall of 1942 after three commercial wells were completed, had another completion this week in Trigood Oil Co. 4 Government for 75 bbl. from the Tensleep. Drilling in the field was resumed last fall when the Trigood company completed its 3 Government for 100 bbl. A 7-mile 4-in. line was completed from the field to the railroad and the oil is now being marketed. It is a small dome which was first proven in 1923.

Outpost Reports Saturation

Ohio Oil Co. 4 Mack OPC-4, ⅛ mile northwest of the Minnelusa Oil Co. Tensleep discovery in Elk basin was last reported running casing at 4,542 ft. It is a "tight" hole, but reports are to the effect that good saturation was encountered in nice sand in the Tensleep and that the hole has gone through that formation and is on its way down to explore the Madison lime.

Mack Drilling Co. 1 Reeder, near Thompson, Utah, which was drilled to 4,207 ft. last fall by the Plant Defense Corp. for the Utah Magnesium Corp., and showed for an oil producer in the Pennsylvanian-Paradox formation, was opened up in an attempt to make a test. However, the well had been standing so long that the walls had begun caving and the attempt was unsuccessful. It was hoped that a bailing test could be made. It was then decided to go ahead with the drilling of four additional wells to determine the lateral extent of the carnallite as well as the oil and gas possibilities. The well was bled several times through the valve after it had been shut in, giving favorable indications of being commercial, having built up 500 lb. pressure at the casing head through a hole full of mud, and through a bridge.

WYOMING COMPLETIONS

Iron Creek, Natrona County: Edward Wikler 1 Government, CWL NW NE 14-32n-82w, T.D. 221 ft., 10 bbl. per day from sand at 138-170 ft., pumping.

Notches, Natrona County: Trigood Oil Co. 4 Government, NE SE NW 10-37n-85w, T.D. 2,918 ft., top Tensleep 2,895 ft., pumped 75 bbl. per day.

Oregon Basin, Park County: Ohio Oil Co. 6 Custer Petroleum, NE NE SE 31-52n-100w, T.D. 3,586 ft., 5½-in. 3,535 ft., perf. 3,386-3,430 ft., pumped 350 bbl. per day from Embar after acid.

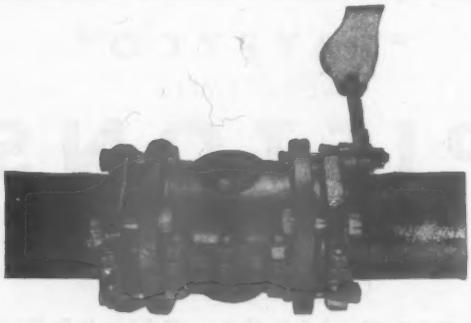
MONTANA COMPLETIONS

Cut Bank, Glacier County: Trigood Oil Co. 2 Tribal-230, SE SW SW 29-32n-5w, T.D. 2,908 ft., no Sunburst sand, Cut Bank 2,841-75 ft., main pay 2,869-75 ft., swabbed 165 bbl.

Texas Co. 5 Willis, SE NE SW 20-32n-5w, T.D. 2,670 ft., 7-in. 2,584 ft., no Sunburst sand, Cut Bank 2,575-2,617 ft., main pay 2,610-17 ft., swabbed 137 bbl.

Kevin-Sunburst, Toole County: Prevol & Shay 12 Waite, NE NW NE 24-36n-3w, T.D. 1,570 ft., dry in contact at 1,538-40 ft., water at 1,579 ft.

Texas Co. 10 Swears, NW NE NW 9-35n-2w, T.D. 1,623 ft., contact 1,617-23 ft., acid, pumped 7 bbl. per hr.



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EASTERN TEXAS FIELDS

Deep Tests Under Way In Nine Counties

DALLAS, Tex.—Ten deep exploratory tests were under way in the East Texas district last week. The rig had not yet been moved to Byrd-Frost 1 C. L. Marsh, southwestern Anderson County Trinity sand test in the Box Survey, Tide Water 1 Bacon, J. Maximillian Survey, Franklin County, 4 miles north of Scroggin, was drilling below 6,668 ft. after recovering twisted-off drill pipe. The test had found the Paluxy dry at 5,710 ft.

In Henderson County, Stanolind 1-B Tri-Cities unit was shut down at total depth 7,650 ft. fishing for cones lost from core bit. Same company's 1-D Tri-Cities unit was drilling below 6,050 ft. The Smackover lime test in Hunt County. Humble Oil & Refining Co. 1 F. F. Graham, 1 mile northwest of the Weiland Woodbine sand pool, was rigging up. Hollandsworth Drilling Co. 1 W. H. Baker, W. A. Wood Survey, 1½ miles northeast of Cash, Hunt County, was building derrick. Two miles northwest of Campbell, Stanolind Oil & Gas 1 Tilson heirs, C. C. Dale Survey, was moving in materials for a Paluxy test.

Robertson County received a new deep project, 2 miles northwest of the town of Calvert, due to explore the Trinity formations, when Magnolia staked 1 W. C. Anderson, 1,980 ft. from the northwest line and 660 ft. from the southwest line of 276-acre tract in the Jacob Fisher Survey. The test is on a block of 18,000 acres assembled last year and tested with geophysics. It is in the western part of the county, on the Balcones fault zone, about 10 miles southwest of the famous Kosse well which blew a lot of oil from a crevice many years ago and then went dead. The Magnolia well is slated to go to 8,000 ft.

Derrick had been erected on American Liberty Oil Co. 1 Republic Insurance Co., eastern Rains County test contracted to 6,500 ft., which lies 2 miles east of Emory in the Howell Survey. In Shelby County, Paul Pewitt 1 Pickering Lumber Co., Milton Cook Survey, swabbed salt water with show of oil after treatment of 5,000 gal. acid through perforations at 6,544-60 ft., and was shut down. No information is being given out on this test, but it has been reported that royalty buyers have been offering fancy prices for close-in minerals.

Wycliffe 1 Hackett, Smith County, was drilling below surface casing set at 1,509 ft., headed for 9,700 ft. On the east side of the Coke field in northern Wood County, Amerada 1 Turner, Smackover test, had set surface casing at 797 ft. and was waiting on cement. Southeast of the Coke field, Bobbie Manziel was drilling below 2,000 ft. on his 1 Bailey, northeast corner of the S. Burch Survey.

New producer for the Quitman Paluxy sand pool is Delta Drilling and Shell Oil 1 Blalock-Goldsmith, west offset to the discovery. It had 44 ft. of oil sand, and perforated 5½-in. casing set at 6,425 ft. Potential test was being run Friday. South of this well, Shell 2 Goldsmith ran 4½-in. casing to total depth of 6,433 ft. in water sand, and will perforate opposite 32 ft. oil sand topped at 6,310 ft.

EAST TEXAS COMPLETIONS

Wildcats

Bowie County: P. D. Bowlen 1 A. L. Simms, 660 ft. from Wly. E line, 1,980 ft. from S line of S 1,130 acres of 2,058-acre tract, or 5,075 ft. from W, 1,980 ft. from S H. C. Williams Sur., elev. 350 ft., Woodbine 3,068 ft., Goodland 3,765 ft., Paluxy 3,838 ft., Pettit 5,955 ft., Travis Peak 6,060 ft., Smackover 8,860 ft., dry, T.D. 8,987 ft.

Freestone County: Carter-Gregg Oil Co. 1 W. W. Steward, 1,618 ft. from E, 1,864 ft. from S Jas. James Sur., elev. 342 ft., I.P. 25,000,000 ft. gas, perf. 4,001-6 ft., pay, Woodbine sand, P.B. to 4,010 ft. from T.D. 4,048 ft., gas discovery.

Van Zandt County: A. F. Carter 1 J. H. Hazel, 660 ft. from S & E 40-acre tract, or 1,010 ft. from Sly W, 660 ft. from S line H. C. Marrs Sub., dry, T.D. 6,493 ft.

Fields

Hawkins, Wood County: Humble 1-B A. T. Clift unit, 330 ft. from W'ly N, 467 ft. from W 40-acre tract, 1,800 ft. from N. 2,300 ft. from W Jas. Pollock Sur., elev. 428 ft., flowed 480 bbl., pay 4,818-26 ft., Woodbine sand, P.B. to 4,830 ft. from T.D. 4,890 ft.

Kerens, Navarro County: L. T. Davis 1 R. P. Walker, 660 ft. from NW, 660.8 ft. from SW J. H. Millican Sur., elev. 368 ft., flowed 60,000,000 ft. gas, pay 3,026-31 ft. in Woodbine sand, P.B. to 3,034 ft. from 3,260 ft.

N. CENTRAL TEXAS

Stephens County Wildcat Finds Oil Saturation in Caddo Lime

ABILENE, Tex.—J. D. Hancock 1 Black Brothers, Ellenburger lime project in north central Stephens County, drilled saturated Caddo lime from 3,252-67 ft., showing 250 ft. oil-cut mud in 10 minutes on drill-stem test. The test, located SW SW Section 1144, T.E.&L. Survey, is contracted to test the Mississippi and Ellenburger horizons, and at last report was drilling ahead.

Deep wildcat for Jones County was announced last week by G. M. Gillespie et al, who will drill 1 J. J. Roberts, C SE NW Section 47, Orphan Asylum Land, 4½ miles southeast of Anson. It is contracted to 4,000 ft., but will test all the sands of the Cisco series as well as the Palo Pinto lime. It is being drilled with cable tools.

Hunter & Hunter and F. Kirk Johnson 1 Martin, northwest Callahan County wildcat, found only a very small show in the King sand, and was drilling ahead to the Swastika. Hunter & Hunter staked another interesting wildcat in the Oplin area of Callahan County. It is their 1 Tom Windham, C W½ NW Section 145, Block 2, G.H.&H. Survey, ½ mile southeast of the old Empire 1 Johnson, NE NE NE Section 146, which made a tremendous gas and oil flow late in 1927 from total depth 4,170 ft. and went to salt water. North and northeast offsets were dry, but a small producer was completed ⅜ mile south by Warren-Hays Corp. The area has been unsuccessfully explored to the north and west, but never on the east.

No production tests have yet been made on the two completed wells in the Rock Crusher pool of Coleman County, and the third test, Sohio Oil Co. 1 Ray, north offset to the discovery, is now coring in the Gardner sand below 3,100 ft.

NORTH CENTRAL TEXAS

WICHITA FALLS, Tex.—Continental Oil Co. 1 Richardson, west offset to the discovery well in the Mueller pool, producing from the Simpson sand, had run casing to 6,073 ft. for completion in the Bend section topped at 6,015 ft. Saturated lime was drilled from 6,030-70 ft., and drill-stem test showed 1,350 ft. of oil and 650 ft. salt water in 10 minutes.

The new Caddo lime opener in Jack County, Shell Oil 1 Wolfe, Section 3341, T.E.&L. Survey, flowed 55 bbl. oil and 8 bbl. water in 15½ hours. After being shut in for 8 hours, casing pressure increased from 200 lb. to 1,600 lb. Oil is coming through perfo-

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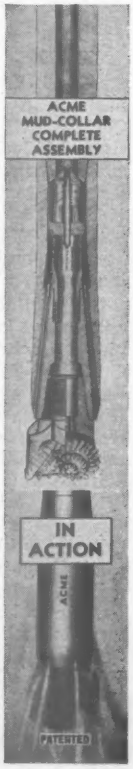

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rations in casing 4,375-4,405 ft. In southeast Jack County, Joe Worsham 1-A Meador, which promised to produce from the Ellenburger 2 weeks ago when it made good flow of wet gas, drilled to total depth 6,137 ft. in Ellenburger with hole full of water, and was preparing to plug back to the lower Strawn sand at about 3,800 ft. where it had had a good show of oil, and shoot the pay.

Shows of oil in both the Strawn and Caddo sections were reported at Hanlon-Buchanan 1 Mooney, Mooney Survey, west of Eliasville, in Young County, but operators were drilling ahead looking for the Mississippi lime. In the same area, same operators have made location for 1 Ada Stewart, 330 ft. from the south line and 990 ft. from west of 160-acre lease in the H. T. Henderson Survey. Projected depth is 4,800 ft. In the extreme northwest part of the county, British American Oil Producing Co. 1 Roach, NW NW Section 304, T.E.&L. Survey had spudded. It is slated to go to 5,200 ft.

In Montague County, Continental Oil 1 Fleming, Secrest Survey, northeast part of the county, recovered stuck drill pipe and was preparing to drill ahead from 3,653 ft.

Southeast edge of the Walnut Bend pool of northeast Cooke County was due for two completions, as Sinclair Prairie 9-B Cox, Lot 68, Fannin County School Land, cleaned itself after perforations were made, and was shut in to run tubing. Sun Oil Co. 1 Maggie Bacon, in the same area, was drilling ahead after a drill-stem test from 4,825-45 ft. showed 2,600 ft. oil and 10 ft. drilling mud in 30 minutes.

NORTH TEXAS COMPLETIONS

Wildcats

Archer County: Paul B. Scott 1 C. McAnally, 330 ft. from N and W lines Blk. 13, W. E. Probert Sur. A-110, dry, T.D. 1,475 ft.

Whitaker Oil 2 W. M. Coleman, 660 ft. from N, 1,880 ft. from W line Sec. 25, Coleman subd., Brazos County School Land, K.M.A. lime, 4,118 ft., Caddo shale 5,375 ft., Caddo lime 5,434 ft., dry, T.D. 6,004 ft.

White & Duncan 1 M. L. Gilmore, Lot 9, Meade subd., dry, T.D. 1,304 ft.

Clay County: Hastings & Knight 1 E. D. Owen, Blk. 50, Specht Col. subd., dry, T.D. 1,215 ft.

Wichita County: W. A. Baker 1 W. H. Ogdon, Sec. 35, H.&G.N. Sur., dry, T.D. 552 ft.

H. B. Dudley 1 Dan Boone, Sec. 1, S.P. R.R. A-264, dry, T.D. 1,361 ft.

Young County: Grace & Grace 1 August Furr, NW NW NW Sec. 336, T.E.&L. Sur. A-577, Caddo 4,308 ft., Caddo conglomerate 4,482 ft., M. Falls 4,520-32 ft., Mississippi lime 4,835 ft., dry, T.D. 4,944 ft.

Fields

Antelope, Clay County: Shell 23-C H. Henderson, 1,315 ft. from S line and 1,215 ft. from W line Sec. 2605, T.E.&L. Sur., elev. 1,100 ft., S.O. 3,150-82 ft., sand, Caddo 5,036 ft., Mississippi 5,796-5,846 ft., dry, T.D. 5,846 ft.

Briar Creek, Young County: Panhandle & Rankin 2 E. T. Slater, 467 ft. from S and E lines 267.5-acre lease, Sec. 3406, T.E.&L. A-1226, elev. 1,166 ft., Caddo 3,771 ft., dry, T.D. 4,370 ft., O.W.D.D. from T.D. 4,158 ft.

Cooper, Archer County: Belfort Oil 1 Kemp

(Continued on Page 100)

Cypress Production Extended Eastward in Iola Pool

MATTOON, Ill.—Central Pipe Line Co. last week extended Cypress sand production in the Iola pool two locations to the east when their 2 Reed, SW NW 14-5n-5e, swabbed 6 bbl. of oil hourly from pay at a total depth of 2,146 ft., and their 3 Reed, SE NW NW 14-5n-5e, cored 5 ft. of good Cypress saturation at 2,142-47 ft. The 2 Reed is producing naturally.

The most encouraging development in the Illinois basin in recent months is the recent discovery of a new Aux Vases sand pool 3 miles north of Thompsonville in Franklin County. On a 1-hour drill-stem test, the discovery well, Seaboard Oil Co. 8 U. S. Coal & Coke, NE NE 26-6s-4e, recovered 1,500 ft. of oil and 60 ft. of oil-cut mud from sand pay at 3,119-32 ft. The well gassed in 15 minutes. Plug was drilled on the well last week and it is now flowing at the rate of 25 bbl. of oil an hour naturally. Operators plan to shoot the well before completion.

Indicative of the recent trend to Devonian and Trenton exploration in Illinois is the recent report that the Carter Oil Co., which has done but little wildcatting in the state, is completing arrangements to drill a test on the Xenia dome in Clay County. Tentative location for the test is the 1 Sapp, SW SE 5-2n-5e, with the Devonian or 4,500 ft., whichever is reached first, as the projected depth.

In Jefferson County, Nash Redwine has taken over the Ohio Oil Co. 1 Prudential Insurance Co., SW SE SW 27-3s-3e, and will drill it on to the Devonian, which is expected at around 4,300 ft. Ohio Oil Co. originally drilled the well to the Ste. Genevieve.

Magnolia Petroleum Co. was drilling around 2,500 ft. near the close of the week at their 1 George Nattier, SW SE 29-4n-1e, south offset to the Devonian discovery in the Patoka pool. Devonian pay was found between 2,850-2,900 ft. in the discovery well.

ILLINOIS COMPLETIONS

Wildcats

Bond County: E. Burgard 1 Klans, NW SW NW 14-6s-2w, dry at 2,460 ft., Ste. Genevieve 1,182 ft., Devonian 2,425 ft.

Christian County: W. Marlow et al 1 Ralph, S½ NE NE 27-15n-2w, pumped 22 bbl., Niagaran 1,900 ft., T.D. 1,905 ft., pool opener.

Clay County: Deep Rock 1 A. R. Thompson, W½ SE NE 23-3n-6e, pumped 97 bbl., natural, McClosky 2,994-96 ft., T.D. 2,996 ft.

Franklin County: I. W. Taylor 1 Perrish, NW NW NE 19-5s-2e, dry at 2,748 ft.

Clinton County: Eason Oil 1 Schnette, SE NE 3-2n-4w, dry at 3,171 ft., Ste. Genevieve 1,162 ft.

Madison County: John Lee 1 Alberts, SW NE NE 11-5n-6w, dry at 811 ft., St. Louis 809 ft.

St. Clair County: Big Four O. & G. 1 Voges, SW SW SE 16-2n-6w, dry at 2,995 ft., Trenton 2,494 ft.

Washington County: T. R. Kerwin 1 Wolf, NW SE SW 13-2s-5w, dry at 1,405 ft., Benoist 1,035 ft.

Wayne County: Texas 1 K. Williams, SW SW NE 16-2s-6e, dry at 3,410 ft., Glen Dean 2,680 ft., Aux Vases sand 3,183 ft., Ste. Genevieve 3,238 ft., Levias 3,248 ft., McClosky 3,318 ft.

White County: Ralph Halbert 1 H. Procter, NE NE NE 17-3s-14w, dry at 3,101 ft., Biehl 1,870 ft., Palestine 2,114 ft., Tar Springs sand 2,359 ft., Glen Dean 2,464 ft., Cypress sand 2,690 ft., Bethel 2,854 ft., Aux Vases sand 2,950 ft., Ste. Genevieve 2,994 ft.

Fields

Ayers, Bond County: Bond C. Gas 1-A Faries, SE SE SW 20-6n-3w, 100,000 cu. ft. gas, Benoist 938-50 ft., T.D. 950 ft.

Belle Rive, Jefferson County: Globe O. & R. 1 Esmon Comm., N½ SE NE 20-3s-4e, pumped 71 bbl., McClosky 3,093-3,100 ft., acidized, T.D. 3,110 ft.

Blairsville, Hamilton County: Magnolia 4 G. L. Travis, SW NW SE 20-4s-7e, pumped 88 bbl. oil and 97 bbl. water, acidized, McClosky 3,424 ft., T.D. 3,516 ft.

Clay City, Wayne County: Pure 2-C J. W. Barth, NW NW SE 2-1n-7e, pumped 68 bbl., shot 2,922-55 ft., Aux Vases sand 2,917-42 ft., T.D. 2,955 ft.

East Inman, Gallatin County: Carter 3 J. L. Crawford, SE SW NE 11-8s-10e, pumped 60 bbl., shot 2,051-59 ft., Tar Springs sand 2,045-60 ft., T.D. 2,067 ft.

Cherry & Kidd 9 Kerwin, NE SW SW 11-8s-10e, pumped 140 bbl., shot 2,059-69 ft., Tar Springs sand 2,053-64 ft., 2,066-70 ft., T.D. 2,071 ft.

Cherry & Kidd 10 Kerwin, SE SW SW 11-8s-10e, pumped 100 bbl., shot 2,037-56 ft., Tar Springs sand 2,042-52 ft., 2,054-56 ft., T.D. 2,059 ft.

Friendsville, Wabash County: McBride 1 Baird, NW NW NW 20-1s-12w, pumped 65 bbl. oil and 2 bbl. water, natural, Cypress sand 2,032-44 ft., T.D. 2,044 ft.

Grayville, White County: Skelly 4-B S. Fern, SW SE SW 20-3s-14w, dry at 2,980 ft., Waltersburg sand 2,306 ft., Tar Springs sand 2,387 ft., Glen Dean 2,439 ft., Cypress sand 2,705 ft., Benoist sand 2,845 ft., Aux Vases sand 2,946 ft., Ste. Genevieve 2,976 ft.

Iola, Clay County: Tide Water 3 C. Davis, SW SW NE 15-5n-5e, pumped 150 bbl., Benoist 2,290-2,310 ft., shot 2,339-44 ft., T.D. 2,353 ft.

Kenner, Clay County: B. F. Williams 1 Green Consol., SE SW NE 30-3n-6e, pumped 22 bbl., shot 2,706-11 ft., T.D. 2,904 ft., P.B. 2,680 ft., Cleaned out to 2,713 ft.

Louden, Fayette County: Carter 3-D M. Myers, NW SE 22-8n-3e, pumped 35 bbl. oil and 170 bbl. water, Devonian 2,967 ft., pay 3,053-54 ft., T.D. 3,054 ft.

Carter 10-D J. Drees, NE NW 22-8n-3e, flowed 100 bbl., Devonian 2,956 ft., pay 3,046-47 ft., T.D. 3,047 ft.

Noble, Richland County: Pure 3 W. E. Wil-

son, SW NE 33-4n-9e, dry at 3,045 ft., Ste. Genevieve 2,945 ft., McClosky 2,984 ft.

Pure 7 A. Snyder, NW NW SW 3-3n-9e, pumped 47 bbl. oil and 67 bbl. water, perf. 2,598-2,607 ft., Weiler 2,587-2,624 ft., T.D. 2,645 ft.

North Maunie, White County: Continental 1 L. Brown, NE SW NE 25-5s-10e, pumped 52 bbl., shot 2,821-35 ft., Benoist sand 2,812 ft., T.D. 2,840 ft.

North Sims, Wayne County: Pure 1 Ella Talbert, NE NE NW 17-1s-6e, pumped 560 bbl., natural, Aux Vases sand 3,013-48 ft., T.D. 3,048 ft.

Pure 1 C. McKitrick, SW NE SW 8-1s-6e, pumped 94 bbl., shot 3,033-42 ft., Aux Vases sand 3,030-50 ft., T.D. 3,050 ft., P.B. 3,042 ft.

Phillipstown, White County: Jarvis & Marcell 6 A. H. Cleveland, NE SW SE 36-4s-10e, pumped 130 bbl., Tar Springs sand 2,288-2,300 ft., 2,308-38 ft., T.D. 2,338 ft.

Jarvis & Marcell 9 E. Spencer, NE SE SW 31-4s-11e, pumped 459 bbl., Clore 1,945-2,006 ft., T.D. 2,310 ft., P.B. 1,728 ft.

Jarvis & Marcell 3 L. G. Cleveland, NE NE NE 1-5s-10e, pumped 103 bbl., Tar Springs sand 2,270-89 ft., 2,308-15 ft., 2,317-27 ft., T.D. 2,329 ft.

Roland, White County: Magnolia and Carter 1 General Life Ins. Co., NE SE SW 1-7s-8e, pumped 44 bbl., shot 2,190-94 ft., Waltersburg sand 2,186 ft., T.D. 2,194 ft.

Salem, Marion County: Texas 5 Snyder, SW SW NE 16-1n-2e, pumped 45 bbl., shot 1,917-22 ft., T.D. 1,931 ft.

South Bartelso, Clinton County: Texas 1 H. Suhl, SE NE 20-1n-3w, pumped 32 bbl., acidized, Devonian 2,478-86 ft., T.D. 2,652 ft.

South Lawrence, Lawrence County: McCarthy 1 E. O. Olds, SE SE SE NW 25-2n-12w, dry at 2,125 ft., Glen Dean 1,609 ft., Hardinsburg 1,662 ft., Golconda 1,705 ft., Barlow 1,774 ft., Cypress sand 1,833 ft., Benoist sand 1,939 ft., Ste. Genevieve 2,054 ft., McClosky 2,104 ft.

South Mason, Effingham County: Jarvis Bros. 3 Boyce, SE SW NE 34-6n-5e, pumped 30 bbl., Benoist sand 2,270 ft., T.D. 2,284 ft.

Stokes, White County: Pure 2-B E. A. Pyle, NW NW NW 20-6s-9e, dry at 3,280 ft., Benoist sand 3,037 ft., Aux Vases sand 3,078 ft., Ste. Genevieve 3,114 ft., McClosky 3,230 ft.

West Inman, Gallatin County: Globe O. & R. 1 Herrington-Hish, SE NE SE 16-8s-9e, pumped 13 bbl., shot 2,509-19 ft., Cypress sand 2,502 ft., T.D. 2,519 ft.

West Jeff, Wayne County: Deep Rock 1 Balding-Hogons, NE SE 7-1s-8e, pumped 25 bbl., acidized, McClosky 3,249-51 ft., T.D. 3,300 ft.

Woodlawn, Jefferson County: Obering & Duncan 2 Ragan, SW NE SW 25-2s-1e, pumped 123 bbl., Benoist 1,989-96 ft., shot 1,996-99 ft., T.D. 1,999 ft.

E. Ruwaldt 2 Rossi Rynski, SW NW NW 35-2s-1e, pumped 120 bbl., shot 1,997-2,008 ft., Benoist 1,997 ft., T.D. 2,008 ft.

OHIO, INDIANA

Brush Creek Field Extended Half Mile Southward

ZANESVILLE, Ohio. — The Brush Creek gas field was extended ½ mile south by the completion of a 3,675,000-cu. ft. well drilled by Industrial Gas Corp. on the Charles Fye tract in Section 35, York Township, Morgan County. The Clinton sand was found at 4,217-50 ft. Two fair oil wells were completed in the northeast part of the Clayton pool and a gas well was found along the west edge. The Belmont Quadrangle failed to find any production in its wildcat in Brecksville Township and plugged the well at 3,338 ft.

OHIO COMPLETIONS

Ashland County, Mohican Township: Ohio Fuel 2 Maude Glenn, Sec. 5, Clinton, 272,000 cu. ft., T.D. 2,766 ft.

Athens County, Lodi Township: Ohio Fuel 2 J. I. Montel, Sec. 3, Cow Run, 835,000 cu. ft., T.D. 678 ft.

Coshocton County, Monroe Township: Ohio Fuel 1 Elizabeth Still, Sec. 5, Clinton, dry, T.D. 3,451 ft.

Cuyahoga County, Brecksville Township: Belmont Quadrangle 1 Metropolitan Park Bd., Lot 35, Clinton, dry, T.D. 3,338 ft.

Knox County, Monroe Township: C. A. Davis 1 John Yarman, Lot 4, Clinton, dry, T.D. 2,622 ft.

Lorain County, Penfield Township: Ohio Fuel 1 W. I. Oglesbee, Lot 9, Clinton, 1,130,000 cu. ft., T.D. 2,490 ft.

Medina County, Hinckley Township: Hulse & Kundtz 3 W. A. Firestone, Lot 50, Clinton, dry, T.D. 3,406 ft.

Monroe County, Malaga Township: Drumm & Ludwick 3 Henry H. Claus, Sec. 28, lime, 2 bbl., T.D. 1,234 ft.

Seneca Township: Spangler & McCort 2 Ella Howiler, Sec. 36, Berea, 50,000 cu. ft., T.D. 1,557 ft.

Morgan County: Bloom Township: Industrial Gas 1 Hiram F. Barr, Sec. 4, Clinton, 200,000 cu. ft., T.D. 4,535 ft.

York Township: Industrial Gas 1 Chas. Fye, Sec. 35, Clinton, 3,675,000 cu. ft., T.D. 4,253 ft.

Muskingum County, Hopewell Township: Atha 1 Mary C. Black, Sec. 11, Clinton, dry, T.D. 3,550 ft.

Perry County, Jackson Township: Kissling Drlg. 1 S. W. Gordon, Sec. 24, Berea, 351,000 cu. ft., T.D. 1,021 ft.

Madison Township: Preston Oil 2 Leonard Samson, Sec. 33, Clinton, 65 bbl., T.D. 3,289 ft.

Preston Oil 1 Clinton Hammer, Sec. 33, Clinton, 57 bbl., T.D. 3,358 ft.

Reading Township: Pure Oil 2 Erman Brown, Sec. 1, Clinton, 766,820 cu. ft., T.D. 3,265 ft.

Summit County, Copley Township: J. A. Upham 1 A. J. Harris, Lot 18, Clinton, 552,000 cu. ft., T.D. 3,672 ft.

INDIANA COMPLETIONS

Gibson County: Superior 1 S. B. Thompson, NW SE NW 25-2s-12w, pumped 187 bbl. oil and 5 bbl. water, acidized in McClosky, T.D. 2,454 ft.

Posey County: Carter 1 Isaac Wolfe, SW SW 14-7s-14w, dry at 2,901 ft., Kincaid 1,615 ft., Glen Dean 2,185 ft., Golconda 2,297 ft., Barlow 2,423 ft., Cypress sand 2,444 ft., Benoist sand 2,547 ft., Renault 2,645 ft., Aux Vases 2,704 ft.

C. V. Richardson 1 S. S. England, NE NE NW 9-7s-14w, dry at 2,963 ft., Kincaid 1,637 ft., Menard 1,953 ft., Tar Springs sand 2,149 ft., Glen Dean 2,191 ft., Cypress 2,481 ft., Benoist 2,544 ft., Aux Vases sand 2,755 ft.

EASTERN KENTUCKY

ASHLAND, Ky. — Drilling operations in this part of the state showed little change in the past few days with only one gas well reported completed. However, one dry hole was reported and despite weather conditions, road repairing and building are being pushed at several locations.

Kentucky-West Virginia Gas Co. has completed well No. 710 on the F. C. Maynard tract on Big Branch in Pike County at a total depth of 1,172 ft. in Salt sand. The well has an open flow of 1,979,000 cu. ft. of gas daily.

The same firm hit a dry hole in well No. 5422 on the William Triplett land on Jones Fork in Knott County, going 2,945 ft. in brown shale.

CANADIAN FIELDS

Canadian Oil and Gas Production at Peak in 1942

CHATHAM, Ont.—Crude petroleum and natural-gasoline production from all Alberta fields for the week ending February 22 average 26,731 bbl. daily compared with 27,399 bbl. daily for the previous week.

Canadian Production Figures

Official figures just issued show that the production of crude petroleum for all Canada in the year 1942 totaled 10,362,801 bbl. compared with 10,123,532 bbl. in 1941. Alberta production increased from 9,928,162 to 10,153,311 bbl., and New Brunswick from 22,332 to 26,879 bbl. In the Ontario fields the production was down to 145,000 bbl., compared with 156,919 bbl. in 1941. The highest percentage of increase was in the Fort Norman field of the Northwest Territories, where the 1942 output reached 37,521 bbl. compared with 14,119 bbl. in 1941.

Natural gas marketed in all Canada in 1942 aggregated 43,900,733 M.c.f. compared with 39,552,333 M.c.f. in 1941. These figures do not include Turner Valley waste gas burned in the field. The increase in gas consumption was consistent through the 12 months; and, with domestic heating and ordinary commercial and industrial consumption restricted in Ontario, was attributable to the increased demand for natural gas for essential war industries.

Armelgra Oil Show

In the Vauxhall area, southeastern Alberta, Imperial-Armelgra 1, LSD 16, 19-13-13w4, finished at 3,131 ft. Good oil shows were encountered in the Ellis between 3,100 and 3,124 ft. and a further show in the upper lime, which was contacted at 3,125 ft. On deepening to 3,131 ft. water intrusion developed necessitating the cementing off of the lime formation. Production tests are being continued in the Ellis formation. Imperial Oil has taken up a further reservation of 71,056 acres, mainly in Townships 12 and 13, Ranger 16 and 17w4, in the Vauxhall-Grantham area, west of the Armelgra well, and in preparing for exhaustive tests of the possibilities.

Fort Norman Operations

The issuing of new federal Govern-

(Continued on Page 111)

KANSAS, NEBRASKA

Lansing-Kansas City Lime Is Productive in Sheridan County

A WILDCAT in eastern Sheridan County, 12 miles from nearest production was reported to be flowing from 7 to 10 bbl. of oil an hour in the Lansing-Kansas City lime early this week.

The well, Union Oil Co. of California 1 Pratt Ranch, NW NE SW 23-8-26w, was drilled to the Arbuckle lime, which was dry, at 3,903 ft. The casing was then perforated at 3,808-17 ft., cleaned out and acidized and the hole filled 2,600 ft. with oil in 40 minutes. Location of the well is 2 miles southwest of the town of Studley and 12 miles southwest of the small Penokee Lansing lime pool of Graham County.

In Decatur County, northwestern Kansas, Phillips Petroleum Co. and Helmerich & Payne 1 Savage, NE NE NE 3-1-27w, was drilling below 3,650 ft. at the first of the week and looking for the Arbuckle lime. A show of oil in Lansing lime at 3,411-36 ft. was passed up and it is probable that the well will be plugged back for testing if the Arbuckle zone is found dry.

In Phillips County, 2½ miles north of the Dayton Lansing-Kansas City pool, Tom Allen and Cooperative 1 Skelton, NE NW 13-2-19w, made a small pumping well. Perforations and an acid treatment in lime at 3,488-3,502 ft. recovered ¼ bbl. of oil an hour. Additional holes and acid at 3,406-22 increased the oil to 3½ bbl. an hour and it was given a potential of 72 bbl.

KANSAS COMPLETIONS

Wildcats

Marion County, 3 mi. NE of Crowther: Ward McGinnis 1 Decker, SW SE NW 20-17-1e, dry, T.D. 2,852 ft., Lansing 2,204 ft., Mississippi lime 2,813 ft.

McPherson County: Adair & Morton et al 1 Stein, SE SE NW 9-18-1w, dry, T.D. 2,810 ft., Kansas City 2,210 ft., Mississippi lime 2,770 ft.

Republic Natural Gas 1 Galle, SE SE SE 11-18-1w, dry, T.D. 2,845 ft., Lansing 2,240 ft., Mississippi lime 2,800 ft., small show oil 2,827 ft.

Rice County: Bay Pet. 1 Lackey, NW NW SE 29-21-7w, dry, T.D. 3,450 ft., Lansing 2,955 ft., Mississippi lime 3,429 ft., show oil 3,435 ft.

Fields

Deerhead, Barber County: Champlin Ref. 1 Stumph, SW NE SW 24-32-15w, dry, T.D. 5,303 ft., Lansing 4,230 ft., Arbuckle 5,256 ft.

Drach, Stafford County: Stanolind 5 Schartz, NE NE 13-22-13w, pumped 602 bbl., Arbuckle 3,673-76 ft.

Eldorado, Butler County: Phil-Han 1-A Robison, NE SE NE 18-25-5e, pumped 100 bbl., Mississippi lime 2,535-56 ft.

Fox-Bush, Butler County: Morrison Bros. 3-A Bush, NW SE NW 24-29-5e, dry, T.D. 2,842 ft., Bartlesville 2,807 ft.

Greenvale, Russell County: National Ref. and Phil-Han 1 Uopat, S½ SE SE 33-14-12w, pumped 435 bbl., Lansing 2,972-78 ft.

Hall-Gurney, Russell County: Gulf 2 Fink, SW SE 15-14-14w, pumped 488 bbl., Lansing 3,031-3,175 ft., T.D. 3,266 ft.

Texas 4 Goodhart, NE SE 25-14-13w, pumped 272 bbl., Arbuckle 3,140-41 ft.

Kraft-Prusa, Barton County: Texas 2-B Burmeister, NE SE 2-17-11w, pumped 168 bbl. in 10 hr., Arbuckle 3,393-99 ft.

Kraft-Prusa, NE, Barton County: Phillips 1 Blue, S½ SW SE 36-16-11w, dry, T.D. 3,400 ft., Arbuckle 3,370 ft.

Lindsborg, McPherson County: Dickey Oil 1 Rundbeck, W½ SE SE 18-17-3w, pumped 23 bbl., Viola 3,349-55 ft., T.D. 3,488 ft.

Lindsborg, SW, McPherson County: Auto-Ordnance 3 Bengstrom, W½ SW SE 25-17-4w, pumped 16 bbl. an hr., Viola 3,384-94 ft.

Lorraine, Ellsworth County: Phillips 4-A Ogden, S½ S½ SW 26-17-9w, old T.D. 3,182 ft. in Arbuckle, old potential 1,251 bbl., T.D. 3,643 ft. for input well, took 284 bbl. in 1¼ hr. with no pressure, Lamotte sand 3,566 ft., recompletion.

McLouth, Jefferson County: Apperson 2 Bower, SW NE NE 5-10-20e, dry, T.D. 1,651 ft., sand 1,310 ft.

McLouth, Leavenworth County: Charles Miller 2 Bell, N½ SW NW 7-10-21e, dry, T.D. 1,342 ft., sand 1,305 ft.

Peace Creek, Reno County: Cities Service 4-B Keesling, SW SE SE 1-23-10w, pumped 277 bbl., Viola 3,732-34 ft.

Ritz-Canton, McPherson County: E. B. Shawver 1 Lively, SW SW NW 21-19-1w, dry, T.D. 3,488 ft., old T.D. 2,971 ft. in Mississippian chat, old potential 20,000,000 cu. ft. gas, Viola 3,355 ft., Simpson 3,398 ft., recompletion.

Silica, Rice County: Phillips 4 Miner, SW SE 35-19-10w, pumped 202 bbl. in 11 hr., Arbuckle 3,282-85 ft.

Trapp, Russell County: Cities Service 5 Ochs, NW NE 23-15-14w, pumped 120 bbl., Arbuckle 3,369-79 ft.

Great Lakes Carbon 1 Maag, SE NW SE 7-15-13w, old T.D. 3,269, new potential 650 bbl. in Lansing 3,009-21 ft., 852 bbl. in Arbuckle 3,263-69 ft., recompletion.

Wakeeney, Trego County: Watchorn Oil & Gas 3 Rhodes, SW NW 14-11-23w, dry, T.D. 4,075 ft., Arbuckle 3,982 ft.

Wilkens, Ellsworth County: C. E. Ash 1-C Wilkens, N½ NE SE 13-17-10w, dry, T.D. 3,279 ft., Arbuckle 3,258 ft.

Winget, Rush County: Falcon-Seaboard 1 Winget, SE NW SE 15-16-16w, dry, T.D. 3,542 ft., Arbuckle 3,507 ft.

Witt, Russell County: A. H. Witt 1 Boxberger, SW NE SE 3-14-14w, pumped 249 bbl., Lansing 2,975-80 ft.

Zenith, Stafford County: Great Lakes Carbon 1 Buckle, E½ SE NW 3-24-11w, pumped and flowed 171 bbl. in 8 hr., potential 513 bbl., Viola 3,700-30 ft.

Stanolind 2 Harbison, N½ SE NW 11-24-11w, old T.D. 3,734 ft., acidized and flowed 25 bbl. an hr., recompletion.

NEBRASKA

ST. JOSEPH, Mo.—R. L. Ferguson and Edwin S. Towle have started drilling below surface pipe at their 1 Della Ehbauer in the Verdon vicinity of Richardson County, Nebraska, and were below 1,000 ft. as the week closed. The wildcat is in NW NW NE 2-2n-15e, ½ mile northeast of a hole drilled by the old I.T.I.O. Ferguson and Towle farmed out the deal from Magnolia Petroleum Co.

In the McLouth, Kansas, pool, Apperson 2 Bower was a dry hole in SW NE NE 5-10s-20e. There was a show of oil at 1,640 to 1,643 ft., total depth. Sand was found at 1,310 ft. and Mississippi lime at 1,511 ft. O. J. Connell was waiting on cement at 3 Mosberger in E½ NE NE 28-9s-20e, Jefferson County, Kansas. Six-inch pipe was set at 1,320 ft. and total depth was 1,332 ft. Apperson 3 Bower in SE NE NE 5-10s-20e, Jefferson County, was drilling at 1,145 ft.

In the Leavenworth County portion of the McLouth pool Charles Miller 2 J. A. Bell was a dry hole at total depth of 1,342 ft. There was a slight show from 1,340 ft. to the bottom. Sand was found at 1,305 ft. and Mississippi lime at 1,335 ft. Miller moved the machine to 3 Bell in SE SW 6-10s-21e, Leavenworth County.

Oklahoma Fields

(Continued from Page 86)

dry, T.D. 3,067 ft., Bartlesville 3,029 ft.

Oklahoma County, E of Oklahoma City: Champlin Ref. 1-A Noble, SE SE NE 30-12n-2w, dry, T.D. 7,484 ft., Avant 4,701 ft., Oswego 6,340 ft., Hunton 6,740 ft., Viola 7,130 ft., Wilcox 7,200 ft., second Wilcox 7,435 ft., in second Wilcox zone recovered 6 ft. of sandy dolomite with some salt.

Fields

Brooksfield, Pottawatomie County: Continental 3 Baker, SW SE 33-9n-3e, flowed 408 bbl., Hunton 4,830-50 ft.

Cumberland, Marshall County: Pure 3 Thompson-108, SE NE NE 28-5s-7e, flowed 1,128 bbl., sand 5,819-5,929 ft., T.D. 5,934 ft.

Isom Springs, Marshall County: George Snell 2 fee, SE NW SW 31-7s-6e, pumped 15 bbl., 488-495 ft.

Pauls Valley, Garvin County: Ohio 1-B Huckaby, SE SW NE 25-4n-1w, pumped 180 bbl., sand 4,045-75 ft., 456 bbl. water.

Roper, Pontotoc County: W. A. Delaney 1 Starritt, W½ NE NW 26-5n-5e, pumped 60 bbl., Hunton 2,395-2,410 ft., T.D. 2,603 ft.

Lake Oil 1 Patsy Delaney, NW NE 27-5n-5e, pumped 30 bbl., Viola 2,585-2,625 ft., T.D. 2,723 ft.

Seminole, Seminole County: Mid-Continent 3 March, NE NW 13-9n-6e, flowed 80 bbl., Hunton 4,013-41 ft.

C. R. Calpet 1 Earlsboro, E½ SE NW 33-9n-6e, dry, T.D. 2,632 ft.

St. Louis, North, Pottawatomie County: Cities Service 1 Rowott, SE NW 23-8n-4e, dry, T.D. 4,319 ft., Earlsboro 3,695 ft.

Vanderslice area, Creek County: J. E. Crosbie 1 Wall, SE SE SW 30-14n-7e, 17,500,000 cu. ft. gas, Prue 2,838-67 ft., 855 lb. R.P.

Sunray 1 Poor, W½ SW SW 30-14n-7e, 5,500,000 cu. ft. gas, Prue 2,858-2,900 ft., T.D. 2,916 ft., 915 lb. R.P.

Selby Oil & Gas 2 Gibson, NE SE NW 31-14n-7e, dry, T.D. 2,923 ft., Prue 2,823 ft.

Wewoka Township, Seminole County: Jordan Pet. 1 Lignon, NW NW SE 16-8n-8e, flowed 248 bbl., Hunton 3,918-22 ft., T.D. 4,265 ft.

Miscellaneous

Lincoln County: Mudge Oil 1 Switzer, SW SW SE 6-15n-5e, flowed 8 bbl., sand 3,513-71 ft.

Okfuskee County: Bryant & Moffett 1-A Douglas, SE NW 36-10n-11e, 2,000,000 cu. ft. gas, Booch 2,155-71 ft., 425 lb. R.P.

LOUISIANA GULF

Deep Test Planned for Richie Area in Acadia Parish

NEW ORLEANS, La.—A deep test of the Richie area, in Acadia Parish, is to be made by Continental Oil Co., which has spotted location for 1 Acadia Parish School Board in 16-7s-1w. Contract depth is 10,500 ft., which is far below the proven producing levels in this area, where wells ordinarily strike pay at around 3,500 ft. The site of the Continental test is about a mile and a half northeast of the nearest Richie field production.

Sun Oil Co. 1 A. T. Burleigh has definitely opened a new deep oil field in the Shuteston area of St. Landry Parish, the third new pool discovered in coastal Louisiana in 1943. Total depth is 11,505 ft., plugged back to 9,578 ft., with perforations at 9,495-9,505 ft. The 2½-in. tubing was set with packer at 9,480 ft. After a little swabbing the well began to flow at the rate of about 100 bbl. daily of 36.6-gravity oil through 9/64-in. choke. Tubing pressure was 950 lb. and casing pressure 200 lb. When the well was shut in the tubing pressure rose to 1,600 lb. and the casing pressure to 1,400 lb. Preliminary to taking an official gage Sun was installing storage tanks.

Jack W. Frazier's 1 Sweet Lake Oil & Land Co., a closely watched wildcat 2 miles northwest of the Chalkley field, Cameron Parish, was abandoned after drilling to 8,954 ft. in sidetracked hole.

Fohs Oil Co., Shell Oil Co., Inc., and Pilgrim Exploration Co. have staked location for an 11,600-ft. test in the Lake Long district of La Fourche Parish. Texas Co. has staked location for a wildcat, 4 State-Cote Blanche Island, in Bay-15s-7e, St. Mary Parish. Projected depth is 11,500 ft.

LA. GULF COAST COMPLETIONS

Fields

Avery Island, Iberia Parish: Humble 3 Petit Anse Co., 25-13s-5e, plugged and abandoned at 9,173 ft.

Bayou Blue, Iberville Parish: Superior Oil Co. 21 Schwing Lumber & Shingle Co., 68-9s-10e, 149 bbl. through 7/64-in. choke, T.P. 660 lb., C.P. 450 lb., gas-oil ratio 403, perf. 4,968-78 ft., T.D. 5,430 ft., P.B. 5,200 ft.

Chalkley, Cameron Parish: Jack W. Frazier 1 Sweet Lake Oil & Land Co., 12-12s-7w, dry at 8,954 ft.

Garden Island Bay, Plaquemines Parish: Texas 60 State-Garden Island Bay, 108-23s-32e, 119 bbl. through ⅛-in. choke, T.P. 610 lb., gas-oil ratio 550, perf. 4,790-4,866 ft., T.D. 6,026 ft.

North Central Texas

(Continued from Page 96)

& Kempner, 812 ft. from E line, 330 ft. from S line Sec. 67, K.W.F.V.L. subd., S.P.Ry. Sur. 1, A-421, elev. 1,055 ft., K.M.A. sand 4,130 ft., Caddo 4,570 ft., S.O. 4,594-4,600 ft., Ellenburger 5,015-70 ft., dry, T.D. 5,078 ft.

Electra, Wichita County: Petroleum Inv. 1 Tom Burnett, Sec. 7, H.T.&B. A-134, I.P. 10 bbl., sand 1,660-73 ft., T.D.

Farmer, Young County: Chas. B. King 8 W. F. Brown, S. Tynes Sur. A-274, I.P. 7 bbl., sand 537-64 ft., T.D.

Ferguson, Young County: Talbot & Schmitz 2 P. Ferguson, 330 ft. from N, 495 ft. from E line L. W. Smith A-1822, pumped 86 bbl., pay 3,481-3,512 ft., T.D.

Halsell, Clay County: Bridwell Oil 11-A Halsell, 2,333 ft. from N, 467 ft. from E line 320-acre lease, John Rogers Sur. A-390, dry, Ellenburger 5,799 ft., T.D. 5,844 ft.

Olney, Young County: Paul Atchley 1 F. Clarke, 1,700 ft. from N, 450 ft. from W line Sec. 208, T.E.&L. Sur., dry, T.D. 860 ft.

Scotland, Archer County: Shell 6-G D. Coleman, 912 ft. from E, 330 ft. from S line Lot 2, Blk. 74, A.T.N.C.L., flowed 760 bbl., pay 5,080-5,216 ft., T.D.

Thornberry, Clay County: Akin & Dimock 10-A Saner, Lot 33, Saner subd., dry, T.D. 1,303 ft.

Akin & Dimock 11-A Saner, Lot 33, Saner subd., I.P. 10 bbl., pay 1,167-74 ft., T.D.

Norwood et al 3 P. Roop, Lot 10, Thornberry subd., I.P. 15 bbl., pay 1,100-15 ft., T.D.

Webb et al 1 C. H. Bentley, B. Gates Sur. A-158, dry, T.D. 1,360 ft.

WEST CENTRAL TEXAS COMPLETIONS

Fields

Merkel, Taylor County: J. F. West 1 Henslee, 330 ft. S, 780 ft. E of S.W.C. subd. 6, Grimes County School Land, but in Sec. 27, Blk. 17, T.&P. Sur., pumped 17 bbl. oil, 12 bbl. water, pay 2,470-88 ft., P.B. to 2,494 ft. from T.D. 2,655 ft.

Sandy Ridge, Jones County: Sandy Ridge Oil 5 McCreight, Sec. 5, Blk. 15, T.&P. Sur., I.P. 200 bbl., shot 30 qt., pay 1,914-31 ft., T.D.

Sedwick, Shackelford County: W. F. Mashburn 1 J. M. Crow, NE NE NE Sec. 18, Lunatic Asylum Land, dry, T.D. 755 ft.

Strand, Haskell County: Roberts and Fain & McGaha 1 Pardue, Sec. 1, S.F.I.W. Sur., I.P. 74 bbl., pay 3,405-07 ft., acid 1,500 gal., T.D. 3,411 ft.

Permian Basin, Panhandle

(Continued from Page 91)

Slaughter, Cochran County: Continental Oil 12-58 C. S. Dean, 651 ft. from S, 3,347 ft. from E Lge. 58, Martin County School Land, flowed 1,179 bbl., 31.5 gravity, acid 11,000 gal., pay 4,950 ft., T.D. 5,002 ft.

Slaughter, Hockley County: J. W. Murchison 1-B R. G. Peck, 440 ft. from S and W Lab. 16, Lge. 42, Rain County School Land, elev. 3,582 ft., flowed 428 bbl. 32.1 gravity, pay 4,912 ft., acid 8,000 gal., T.D. 4,951 ft.

Western St. Gas Corp. 20-B Mallet, 510 ft. from N and E Lab. 1, Lge. 51, Scurry Co. School Land, elev. 3,602 ft., flowed 1,245 bbl., 32.7 gravity, pay 4,998 ft., T.D. 5,041 ft.

Taylor Link, Pecos County: L. D. Lancaster 3-C Univ., NE SW Sec. 28, Blk. 16, Univ. Sur., elev. 2,506 ft., dry, T.D. 1,511 ft.

Milton Unger 1-C Shell Univ., SE SE Sec. 30, Blk. 16, Univ. Sur., dry, T.D. 1,410 ft.

Waples-Platter, Yoakum County: Drlg. & Explor. 2-C Waples-Platter, NE SW Sec. 565, Blk. D, J. H. Gibson, pumped 112 bbl., pay 5,230 ft., T.D. 5,290 ft.

Weiner, Winkler County: Stanolind 6-Brown & Altman, NE NE Sec. 5, Blk. B-11, P.S.L., elev. 2,810 ft., I.P. 128 bbl., pay 2,980 ft., shot 490 qt., 3,004-3,167 ft., T.D. 3,170 ft.

SE NEW MEXICO COMPLETIONS

Fields

Eunice, Lea County: Bay Pet. 1 J. M. Brownlee, Jr., SW SE 25-21s-36e, elev. 3,532 ft., est. 3,000,000 ft. gas and 60 bbl. sulfur water, dry, T.D. 3,956 ft.

Maljamar, Lea County: Johney Cockburn 9-B Miller, NE SE 25-17s-32e, elev. 4,012 ft., flowed 145 bbl. 3 nr., pay 3,140 ft., shot 200 qt. 4,130-4,230 ft., T.D.

Cockburn 3-A Miller, SE SW 26-17s-32e, elev. 3,948 ft., flowed 40 bbl., pay 4,140 ft., shot 380 qt. 3,905-4,100 ft., P.B. to 4,198 ft. from 4,360 ft., T.D.

Square Lake, Eddy County: McDannald & Williams 3 Grier, SW SW 31-17s-31e, elev. 3,799 ft., flowed 65 bbl., pay 2,960 ft., T.D. 3,158 ft.

PANHANDLE COMPLETIONS

Gray County: Magnolia 58 fee No. 227, NE SW Sec. 11, Blk. 3, elev. 2,880 ft., I.P. 231 bbl., 42 gravity, pay 2,792-2,895 ft. lime and dolomite, T.D. 2,895 ft.

Hutchinson County: Phillips Pet. 2-A Ray Ebling, SE NE Sec. 18, Blk. M-16, A.B.&M., elev. 3,229 ft., pumped 160 bbl. 39.4 gravity, pay 3,200 ft., shot 110 qt., T.D. 3,230 ft.

California Fields

(Continued from Page 87)

ft., completed in Kern Front zone of Pliocene age.

Standard Oil Co. 36-15 fee, 15-28s-27e, pumped 18 bbl. net, 14-gravity, 52 per cent cut, T.D. 2,515 ft., 100-mesh perf. 2,350-2,513 ft., completed in Kern Front zone of Pliocene age.

Westates Petroleum Corp. 43 Cauley, 16-28s-27e, pumped 30 bbl., 14.9-gravity, 2 per cent cut, T.D. 2,907 ft., 125-mesh perf. 2,880-2,907 ft., M point 2,558 ft., N point 2,692 ft., Q point 2,752 ft., R point 2,823 ft., S point 2,884 ft., completed in Kern Front zone of Pliocene age.

Kettleman North Dome, Fresno County: Kenda 343-24-H, 24-21s-16e, abandoned as not commercially productive, T.D. 10,726 ft., Temblor and McAdams zones were wet at this location.

Kingsburg wildcat district, Fresno County: Superior Oil Co. 1 White, 29-16s-22e, abandoned in granite, T.D. 5,468 ft., no oil or gas showings reported.

Midway-Sunset, Kern County: Chanslor-Canfield Midway Oil Co. 51-9 fee, 9-32s-23e, pumped 15 bbl., 12 per cent cut, 15.8-gravity, T.D. 1,650 ft., perf. 1,335-60 ft., 1,535-50 ft., 1,565-95 ft., completed in upper Midway zone of Pliocene age.

Standard Oil Co. 71-5-K fee, 5-11n-23e, pumped 52 bbl. 24.6-gravity, 3 per cent cut, T.D. 3,450 ft., P.B. 2,550 ft., 100-mesh perf. 2,425-2,540 ft., completed in Midway zone of Pliocene age.

Mount Poso, Kern County: Chanslor-Canfield Midway Oil Co. 20 Mon, 26-27s-28e, pumped 25 bbl. net, 15.8-gravity, 20 per cent cut, T.D. 1,483 ft., P.B. 1,435 ft., 100-mesh perf. 1,415-35 ft., completed in Vedder zone of Miocene age.

Round Mountain, Kern County: Bishop Oil Co. C Thomas, 12-28s-28e, pumped 145 bbl. net, 14-gravity, 32 per cent cut, T.D. 1,776 ft., 100-mesh perf. 1,754-76 ft., completed in Vedder zone of Miocene age.

LOS ANGELES BASIN

Texas Co. should determine the value of its leases in the La Mirada district of Orange County within another 2 weeks as the company has begun to core at 7,700 ft. in 3-A McNally in 22-3s-11w and may likewise be able to make an estimate on the value of its Buena Park holdings as 5-1-J Buena Park is nearing its objective. Texas has drilled four wells at Buena Park and the results show two small producers and two dry holes. The present well is the fifth to be drilled in what has so far proved to be an accumulation of small importance. The well now drilling may prove to be the last unless it shows

up better than its predecessors. The La Mirada district is located due west of the West Coyote field and has always intrigued operators because there should be a field at that point as it is a logical interval at which to expect the West Coyote anticline to come up again. So far no one has been able to develop commercial production at La Mirada.

Signal Oil & Gas Co. is preparing to drill a wildcat in the Corona Del Mar district and has derrick up on the Irvine Beach property in 6-7s-9w. Shell's 1 Verne Community in the Gilmore Island district of Los Angeles where a deep Miocene test is being drilled has passed the 5,000-ft. level and will probably begin coring solid from now on. Up to the present the company has been coring at intervals. Attempts to secure leases on town lots in the Riverside Drive section of Los Angeles Basin for incorporation into community leases are still under way but stiff resistance has been encountered in certain areas due to the expected small return to the ordinary lot owner.

NORTH LOUISIANA

Offset Locations Are Staked At Calvin Distillate Pool

SHREVEPORT, La.—Two offset locations to the Calvin distillate well in Winn Parish were announced last week. H. L. Hunt F-24 Goodpine, discovery well completed last October and since shut in, was offset to the north 1 mile in NE SW 12-12n-5w, and also to the east in NE SW 18-12n-4w. Fuel for the two rigs, which were reported to be moving in, will be gas from the F-24 Goodpine. An outlet for the distillate and a stimulant for additional drilling will be provided by the routing of the 20-in. pipe line from Beaumont, Tex., to Seymour, Ind., through Winn Parish in the vicinity of Calvin.

ARKANSAS COMPLETIONS

Wildcat, Clark County: Arkansas Louisiana Gas 1 Milsap, N½ SW SW 23-10s-21w, dry, T.D. 4,120 ft.

Columbia County, offset: Roy Lee 2 Pickler, NE SW 23-17s-21w, dry, T.D. 8,182 ft.

Macedonia, Columbia County: Atlantic Ref. 1 Brewer-Warnock, S½ SW 15-18s-21w, 108 bbl. condensate, T.D. 8,058 ft., recompletion.

McAlester Fuel 1 Franks, SE SE 16-18s-21w, 180 bbl. condensate, T.D. 7,954 ft., recompletion.

McAlester Fuel 1 Nipper, CS½ SW 16-18s-21w, 180 bbl. condensate, T.D. 8,100 ft., recompletion.

Lion 1 Foreman-Ford, E½ NW SE 21-18s-21w, flowed 77 bbl. condensate, pay 7,546-60 ft., T.D. 8,950 ft.

Stephens, Ouachita County: Durbin Bond 1 Morgan, NW NE 18-15s-19w, dry, T.D. 4,000 ft.

NORTH LOUISIANA COMPLETIONS

Wildcats

Bossier Parish: Bering Co. 1 Moresi, W½ NE SE 10-22n-14w, dry, T.D. 3,050 ft.

Red River Parish: Westgate-Greenland 1, Westdale, NW NE NE 29-14n-11w, dry, T.D. 3,009 ft.

Fields

Caddo, Caddo Parish: Petroleum Development Co. 1 Caddo Levee Bd., NW NE NE 8-20n-15w, pumped 25 bbl., pay 1,340-1,500 ft., T.D.

J. C. Tippet et al 5 Thigpen-Herold, E½ NE SW 34-22n-16w, dry, T.D. 2,480 ft.

Carterville, North, Bossier Parish: Hunt Oil 1 J. F. Oglee, flowed 54 bbl., Pettit 6,048-6,123 ft., T.D. 6,200 ft.

Haynesville, Claiborne Parish: T. L. James & Co. 2 Winn, SW SW 26-23n-8w, flowed 132 bbl., Pettit 5,568-86 ft., T.D. 5,655 ft.

Joaquin, De Soto Parish: Arkansas Louisiana Gas 1 Fletcher, approx. C 36-12n-16w, 75,000,000 cu. ft. gas, Jeter-Rodessa zone 4,874-82 ft., 4,897-4,947 ft., T.D. 4,950 ft.

MISSISSIPPI

JACKSON, Miss.—Pure Oil Co. 1 J. M. McDowell, wildcat discovery, 6 miles southwest of Natchez, in Adams County, was flowing about 4½ bbl. of fluid hourly at latest report, most of it salt water. Tubing pressure was ranging from 900 to 1,400 lb. Total depth was 11,102 ft., with perforations at 10,285-89 ft.

MISSISSIPPI COMPLETIONS

Madison County: Love Petroleum 1 Hal Jones, SW SW 19-9n-1e, dry, T.D. 9,007 ft.

Sharkey County: The Texas Co. 1 Linzey, SE NW 19-13n-5w, dry, T.D. 5,051 ft.

Yazoo County: H. I. Morgan 1 W. T. Dixon, SW NE 8-10n-2e, dry, T.D. 6,011 ft.

Tinsley, Yazoo County: L. A. Hawkins 1 G. L. Logan, SW SW NE 1-9n-3w, 96 bbl., pay 4,888-4,906 ft., T.D. 4,907 ft.

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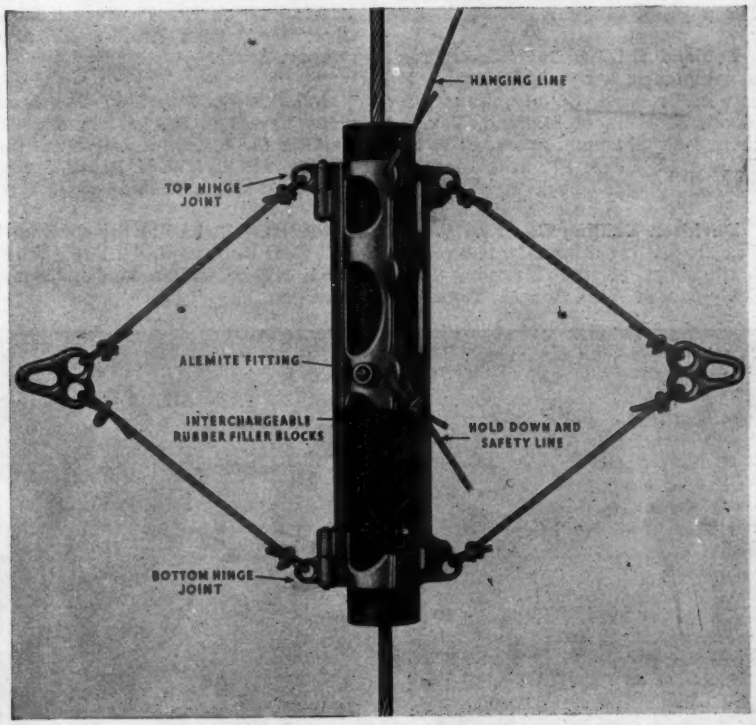

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PATTERSON-BALLAGH WIRE LINE GUIDES

Among the Drilling Contractors

T. L. Wheeler, Wichita Falls, Tex., is moving in cable tools to drill a 4,000-ft. test in Jones County. The test will be known as G. M. Gillespie et al 1 J. J. Roberts, located in SE NW Section 47, Orphan Asylum Lands, 4½ miles east of Anson, Tex.

S. B. Roberts, Abilene, Tex., having just completed the second well in the Strand pool for 74 bbl. per day, has drilled to 1,710 ft. on his third test, 2 Strand, north offset to the first well which made 100 bbl. per hour after acid treatment in the Palo Pinto lime. The pay lies at about 3,400 ft.

Pohland Drilling Co., Odessa, Tex., is completing a new shallow discovery in Crockett County, Texas, for Moore Brothers of Midland, Tex., at their 1-12 Shannon estate, NW NW Section 12, Block FF. Total depth is 2,567 ft., plugged back to 2,398 ft.

Davidson Drilling Co., Fort Worth, Tex., is drilling a 3,200-ft. test on the south edge of the Magnolia-South Sealy pool in Ward County, Texas, for Stanolind Oil & Gas Co. Same contractor is drilling on a 7,500-ft. test 3 miles east of the Emma pool in Andrews County, Texas, for Skelly Oil Co.

Thompson-Carr, Inc., Houston, Tex., has just completed a well in the Apco-Warner pool of Pecos County, Texas, for 813 bbl. per day. "Pat" Carr is now on active duty in the Army as a captain.

Loffland Brothers, Tulsa, and Fort Worth, Tex., have reached a depth of 9,330 ft. on Shell Oil Co., Inc. 1 Blue, Ordovician test in Winkler County, Texas.

Hollandsworth Drilling Co., Longview, Tex., has erected derrick over location for his wildcat test in Hunt County, Texas, 1 W. H. Baker, 3 miles southwest of the Weiland pool.

Robert W. Atha has the contract to drill Gulf Refining Co. 2 Peter White, C N½ NW SE 33-15n-4e, Bay County, Michigan.

Drilling crew on Phillips Petroleum Co.'s rig No. 18 drilling to Ellenburger in the Embar pool, Andrews County, Texas. Left to right: Vin Jeffreys, backup man; J. E. Baggett, motor man; I. H. Nation, driller; Q. W. McKeehan, derrick man, and R. W. Campbell, pipe racker

Rowan Drilling Co., Fort Worth, Tex., is keeping two rigs busy for Shell Oil Co., Inc., in the new Quitman pool in Wood County, Texas, which produces from about 6,400 ft., and is drilling for Amerada on a 9,300-ft. well in the Barnhart pool, Reagan County, West Texas.

Grace & Grace, Wichita Falls, Tex., completed a dry hole for their own account on a farmout from Continental Oil Co. in northwestern Young County, Texas. The well was 1 Furr.

Knight & Ewing, Breckenridge, Tex., recently finished 5 Loving for 100 bbl. per day in the Loving pool of western Stephens County, Texas, at 3,507 ft., Caddo lime.

Big Chief Drilling Co. has the contract to drill Danciger Oil & Refining Co. 1 Sarah V. Ralstin, in C NE SE 20-17n-2e, near Goodnight in Lincoln County, Oklahoma, for a Wilcox sand test. Location is on a seismographed block of about 1,000 acres, assembled by F. L. Bishop, of Tulsa.

Lupher Drilling Co. has been awarded contract to drill Ohio Oil 1 Earl Vaughan, C S½ NE NE 29-15n-11w, Newaygo County, Michigan.

Ashby Drilling Co. has purchased the one portable rotary rig that was being operated in Michigan by Olson Drilling Co. The rig is now on location in Beaverton. Con Melland, drilling superintendent for Olson, has return to Kansas.

Art Audrey, formerly with Robert W. Atha Drilling Co., has transferred to Ashby Drilling Co. Currently he is pushing the rotary rig on location in Calhoun County, Michigan.

Earl F. Wakefield, drilling contractor of Wichita, Kans., has the contract on Wolf Creek Oil Co. 1 Clud, C N½ NE NW 12-31s-4e, 3 miles northeast of the Hittle pool, and 1 mile west of the Wilmot gas pool, Cowley County, Kansas. This is a cable-tool test and the contractor has an interest in the well.

Helmerich & Payne, Inc., drilling contractors and oil operators of Tulsa, who have been active in wildcatting in Oklahoma and Kansas, and who have been drilling a series of outposts on the northwestern part of the Benton arch in Kansas, are going to try

to extend the play into Nebraska. Drilling crews were moving in to 1 Hamilton, in C SE SE 31-1n-24w, southwest of Beaver City, in Furnas County.

Big Chief Drilling Co. will start work on or about April 1 at the 1 Calvin for Basil Wagner and Charles M. Day of Chandler, Okla. It is to be a Wilcox sand test and is located in SW SW NE 3-15n-5e, northeast of the town of Kendricks in Lincoln County, Oklahoma.

Frank Woods, drilling contractor of Wichita Falls, Tex., was drilling below 2,000 ft. on the Devore and Slade wildcat in Castro County, Texas. The test is near the Castro-Swisher county line 8 miles southeast of Nazareth on the Dinwiddie land. It is in Section 10, Block 9-T T.&N.O. Survey. The contract calls for 5,500 ft.

Helmerich & Payne, Inc., Tulsa, has contract and work is under way at Auto-Ordnance Corp. 1 Larson, a wildcat in SE SE NE 22-18-4w, McPherson County, Kansas. Location is 4 miles south and west of the Southwest Lindsborg Viola lime pool.

Glenn H. McCarthy, Houston, Tex., contractor, is drilling two wells for his own account. Both are in the Winnie area of Jefferson County, Texas, where Mr. McCarthy brought in the year's first pool opener of the upper Gulf Coast with his 1 Hankamer-McLean. One is 2 Hankamer-McLean, an offset to No. 1, and the other is 1 Broussard. Both holes are around 5,000 ft. The discovery well was drilled to 8,622 ft., and plugged back to 7,850 ft.

Mac Drilling Co., Houston, Tex., has started work on 1 Cinco Ranch, near Clodine, in Fort Bend County, Texas, for Stanolind Oil & Gas Co. Projected depth is 7,600 ft. This contractor recently completed a gas and distillate well in the Nordheim field of De Witt County, Texas, for Tide Water Associated Oil Co.

Dixie Drilling Co., Houston, Tex., has completed two wells for Texas Co., Unit C and Unit D, in the Erath field of Vermilion Parish, Louisiana, and skidded the rigs for work on Unit L and Unit N for the same company. Contract depth in all these wells is 11,700 ft. Dixie has the contract for 3 City of New Orleans, La Fourche Parish, for Texas. Projected depth is 11,500 ft. This contractor is at completion depths on 1 St. Mary Land, in the Bayou Sale field, St. Mary Parish, for Atlantic Refining Co., 11,500 ft., and 9 Sunset, in the Paradis field, St. Charles Parish, for Texas, 10,500 ft. It is drilling at 8,450 ft. on 1 C. S. Baldwin, a wildcat test for General Crude Oil Co., near De Quincy, in Beauregard Parish.

Drilling Industry Given Permission To Use Quebracho

Modification of WPB Conservation Order M-277 (vegetable and tanning industry) to allow use of quebracho and urunday extracts by the oil-well drilling industry was announced last week by the leather and shoe branch of WPB. The original order, issued February 4, prohibited the use of any of the vegetable tanning materials by the oil industry.

While the amount of quebracho used in drilling muds is not great compared to the quantity used by the tanning industry, it is of extreme importance. Its principal use is with caustic soda to control the viscosity and filter characteristics of the drilling mud. With this material and bentonitic additives, it is possible to produce a mud having a water loss of 10 cc. (30 minutes at 100 lb.) or even lower. Being barred from using it could conceivably result in the loss of a number of bore holes and considerable steel because of a string of stuck pipe due to a poor mud.

During 1943 probably a larger supply of quebracho will be needed in the drilling industry than ever before as those who drill wells direct more attention to mud conditioning as a means of saving steel.

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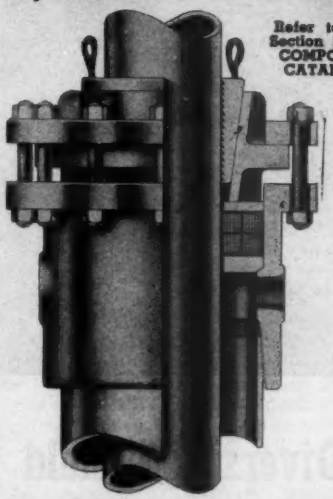

Refer to our Section in the COMPOSITE CATALOG.

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A. N. GRIFFITH

Diversified Field Work Leads to Bigger Job

TEN years of diversified experience in various phases of field operations led A. N. Griffith of Midland, Tex., to his new position of production superintendent for Lario Oil & Gas Co. in West Texas and New Mexico which he assumed March 1.

After graduating from the University of Oklahoma in 1933 with a degree in mechanical engineering, Mr. Griffith worked 2½ years for Phillips Petroleum Co. as a roustabout and junior engineer. He resigned from the Phillips' production-research department to take a roughneck job with a drilling contractor because he wanted well experience. After gaining considerable well experience on the Gulf Coast, Mr. Griffith became division production engineer for Shell Oil Co., Inc., in West Texas and New Mexico, a position he held from 1937 to 1939.

He next accepted employment as drilling engineer, supervising well completions, for the Frank W. Bennett Co. in the Golden Meadow field, Louisiana.

In September 1939, Mr. Griffith went to work for Baroid Well Logging Service and advanced to the position of well-logging superintendent for West Texas and New Mexico. He severed 3½ years' relation with Baroid to join Lario Oil & Gas Co.

Lario has been organizing a complete operating unit in West Texas during the past 60 days. The company is a producing subsidiary of Globe Oil & Refining Co. Until recent weeks, its operating interests were chiefly in the Mid-Continent.

S. Ross Carr, deputy supervisor at Midland, Tex., in the District 8 proration office of the Texas Railroad Commission, has resigned to accept a position with Adams & Bradley, Midland oil-producing and contracting firm. His resignation becomes effective March 15.

Frank C. Henderson, San Antonio, Tex., a veteran Texas producer and natural-gasoline plant operator, having been engaged in various phases of the industry since discovery of Spindletop, was honored March 6 by a group of friends on his eighty-fifth birthday with a party at his home, "Land's End," Palm Beach, Fla. For the last 15 years he has operated a gasoline plant at Sanford, Tex., and was the builder and operator of the first high-pressure cycling plant on the Gulf Coast.

John A. Falkner has gone to Seminole, Okla., as engineer for Gulf Oil Corp. Mr. Falkner left Gulf several years ago to return to Notre Dame University, where he received his degree in engineering. Recently he has been superintendent of the M. W. Turner Co.

Joseph P. Gudger, traffic manager of the Gulf companies, Houston, Tex., and general chairman of Southwest Shippers' Advisory Board, comprising Oklahoma, Arkansas, New Mexico, Texas and Louisiana, presided at the spring quarterly meeting of directors held March 4 at Fort Worth, Tex. The board's executive committee met March 3.

David J. Bratton, formerly office engineer with the geophysical division of Texas Co., Houston, Tex., has been promoted from the rank of captain to that of major in the Army. He is administrative officer of the mortar and antitank instruction group at the Fort Benning, Georgia, infantry school.

Alton J. Burdette, assistant chief of Gulf Oil Corp.'s material accounting division in Houston, Tex., when he entered the Army Air Corps as a lieutenant in May 1942, has been advanced to captain at Pecos, Tex., where he is stationed. Captain Burdette was first sergeant of Company B, Texas Defense Guard, while he was with Gulf, and the commander of the company was **Capt. K. P. Morrison,** chief clerk of the material accounting division.

F. E. RICHARDSON

F. E. Richardson, manager Pan American Pipe Line Co. and assistant manager of the Pan American Production Co. and the Pan American Gas Co., Houston, Tex., has received leave of absence in order to serve in an engineering capacity in construction of the new 20-in. oil-products line from the Gulf Coast to Seymour, Ind. His office probably will be in Cincinnati, Ohio, headquarters of War Emergency Pipelines, Inc. During his absence **E. V. Hewitt,** general superintendent Pan American Production Co., will act as assistant to **E. R. Turner,** vice president of the Pan American companies, and will supervise operations of the three organizations.

Frank Phillips, chairman of Phillips Petroleum Co., Bartlesville, Okla., has been appointed as one of the sponsors of the National Victory Garden Institute, a private organization numbering among its sponsors many of the nation's leading industrialists who regard the 1943 food situation as critical. Chief aim of the institute is 20 million gardens this year.

Thomas W. Leach, independent oil operator and geologist, has received a commission as a captain in the antiaircraft section of the Army, and will leave at once for a refresher course at Camp Callan, near San Diego, Calif. Mr. Leach has been a reserve officer since the first World War. He announced that his Tulsa office would be closed and the North Dakota office will be maintained at Bismarck, with **A. M. Fruh** and **Ray V. Hennen** in charge.

James F. Nolan, Barnsdall Oil Co., is the new president of the Cedar Crest Country Club, the playground on Spring Creek, 50 miles east of Tulsa. The club was started in 1926 and now owns 1,000 acres of land in southern Mayes County.

Capt. David C. Fransen, who was in the scouting department of Humble Oil & Refining Co., Houston, Tex., before he entered military service in February 1942, is now commander of a glider rifle company in the airborne infantry, assigned to Hoffman air-borne station, North Carolina.

R. C. DAVIS

Robert C. Davis, Beverly Hills, Calif., was elected president of the California Stripper Well Association at the annual election a few days ago. Mr. Davis succeeds **A. S. Johnston.** His principal California oil interests are in the Long Beach field. He is also interested in oil production in Illinois and has extensive ranching operations in the San Joaquin Valley section. **Chester F. Yunker,** general superintendent of oil operations for Del Amo Estate Co.; **Edwin P. Crail,** president of Crail Brothers, and **Chester F. Dolley,** president of Atlantic Oil Co., were elected vice presidents. **Thomas H. Work** of the Nordon Corp., was reelected secretary-treasurer and **Richard Fenton** was reelected executive vice president.

T. E. Swigart, president Shell Pipe Line Co.; **John R. Suman,** vice president Humble Oil & Refining Co.; **Harry C. Hanszen,** independent oil operator; **H. O. Clarke, Jr.,** vice president and general manager Houston Lighting & Power Co.; **W. B. Sharp,** president Mission Manufacturing Co., and **Charles A. Perlitz, Jr.,** attorney for George W. Strake, oil producer, will serve as directors of the Houston, Tex., Community Chest and Council for the ensuing year. **Col. James Anderson,** formerly vice president of Humble, is president of the board. Members of the budget committee include **R. V. Hanrahan,** president Humble Pipe Line Co.; **E. R. Turner,** vice president Pan American Production Co.; **L. P. Garrett,** acting vice president Gulf Oil Corp.; **Claud B. Hamill,** independent oil operator, and **Paul Benedum,** Houston representative of Benedum & Trees Oil Co.

M. V. Cousins, personnel director of United Gas Pipe Line Co., announces that 700 employes of that organization are now in war service, many on fighting fronts. Five have given their lives. Ranks range from buck private to colonel in the Army and from apprentice seaman to lieutenant commander in the Navy.

Dr. Cecil E. Boord, supervisor of the A.P.I. pure hydrocarbon-research program since 1938, will address the Southwest Texas section of the American Chemical Society March 17 and 18 on "The Synthesis of Pure Hydrocarbons and the Relation of Their Physical Constants of Molecular Structure." The March 17 lecture will be in Port Arthur, Tex., and the March 18 talk at Houston, at 8 p.m., in the Warwick Hotel.

Herman Jones, supervisor of the Texas Railroad Commission's gas utility division at Austin, Tex., resigned March 1.

H. L. Patterson, manager of Orinoco Oil Co. operations at Maracaibo, Venezuela, recently visited Pure Oil Co.'s offices at Houston, Tex. **M. M. McGar** and **Joe Netick,** employes in the Orinoco production department in Venezuela, have returned to South America after vacationing in this country.

William Wilson, formerly employed by Maracaibo Oil Exploration Co., Dallas, Tex., is now in the Air Forces "somewhere in Africa," and reports that he is seeing plenty of action.

Roy S. Marmaduke, of Carter Oil Co.'s staff at Tulsa, has been transferred to Cut Bank, Mont., as new assistant treasurer of the Santa Rita Oil and Northwest Refining companies, recently acquired by Carter.

Loring G. Bradstreet, independent oil operator of Fort Worth, Tex., is now associated with Clay Brothers Drilling Co., also of Fort Worth. Mr. Bradstreet is getting ready to move in on a wildcat test in southeast Jack County, Texas.

Noel Evans, consulting geologist, formerly with Gulf Oil Corp., and Tide Water Associated Oil Co., is now associated with **Dr. J. V. Howell,** Tulsa.

R. B. MITCHELL

R. B. Mitchell, Houston, Tex., has resigned as division geologist for Stanolind Oil & Gas Co. in its Texas - Louisiana Gulf Coast division and has taken a position with Foran - Boatright & Dixon, consulting engineers. He will continue to reside in Houston. Mr. Mitchell had been with Stanolind 16 years, joining that organization soon after his graduation from University of Michigan, where he received his B.S. degree. He is succeeded as division geologist by **Gentry Kidd,** formerly district geologist in the South Texas district, with headquarters in San Antonio. **H. E. Menger,** geologist in the San Antonio office, has been promoted to district geologist.

Henry A. Roach, president of Delmarva Oil Co. and former partner with L. B. Benton in the firm of Benton & Roach, is now stationed at Tarrant Field, Fort Worth, Tex., in the finance department. Mr. Roach entered the Army in October.

George G. Harrington, Houston, Tex., for the past 11 years chief engineer for Reed Roller Bit Co., and formerly in the engineering department of Houston Gas & Fuel Oil Co. and Houston Lighting & Power Co., has opened an office in Houston as a consulting engineer. Mr. Harrington, who is widely known in the oil-equipment field, is an engineering graduate from the University of Texas and is chairman of the Texas chapter of the American Society for Metals.

Charles E. Shaw has been named by Standard Oil Co. (New Jersey) as manager of its industrial relations department to succeed **F. W. Pierce,** recently named a director of the company.

J. R. Sims, oil scout for Pure Oil Co., has been transferred from Van to Midland, Tex., and will scout the northern district of the Permian basin.

First Lt. Paul McCune, former Fort Worth, Tex., engineer and geologist in the firm of McCune & Michaels, reported Monday, March 8, at Camp Hood, Texas, where he will be attached to a tank destroyer unit. Mr. McCune enlisted in the artillery in 1918, winning his second lieutenant bars before he was 19. After the war, he finished his studies at Colorado School of Mines. He operated in Kansas and New Mexico before moving to Fort Worth in 1930. **F. L. Michaels, Jr.,** will remain in Fort Worth taking care of the firm's clients.

All officers of the West Central Texas Oil and Gas Association were reelected at the annual meeting held Friday, March 5, at Eastland. Officers are **Joseph M. Weaver,** Eastland, president; **W. J. Rhodes,** Breckenridge, vice president; **C. W. Hoffman,** Eastland, vice president; **J. E. Whiteside,** Brownwood, vice president; **A. H. Furse,** Eastland, secretary-treasurer. **Harold G. Neely,** Fort Worth, was also made a vice president.

Ralph Hall, principal of Ardmore (Okla.) Junior High School, has resigned to join the staff of the Independent Petroleum Association of America, as assistant to **Harold B. Fell,** executive vice president.

Market Developments

East Coast

NEW YORK. — Continued though still minor improvement in the East Coast supply situation is apparent with the result that a number of restrictions have been eased and allotments under rationing increased. Conditions in New England, sorest spot in the East Coast transportation-shortage area, have improved appreciably as the result of the consignment of approximately 20 per cent of the total tank-car deliveries to that area and the supplementing of those deliveries by an additional 20,000 to 30,000 bbl. per day of kerosene transported in tank cars.

Changing of the ban on pleasure driving from a compulsory to an "honor" basis was considered one evidence of an improvement in the supply situation but more significance is attached to the increase allowed in the value of the No. 5 fuel-oil ration coupon to 10 gal. Obviously this increase could not have been permitted without a corresponding improvement in the supply situation. Gasoline supplies on the other hand have been more than adequate for the severely rationed demand. Production of gasoline at East Coast refineries has been high, according to reports, due to the need for maximizing war products output.

Mid-Continent

HIGHER demand from the rural sections throughout the Middle West was reported developing this week in the refinery gasoline market. Inquiries are brisk and refiners report that orders are in reasonably high volume, considering the rationing restrictions. Mileage restrictions are less drastic in the rural sections and this, coupled with liberal allowances of fuel for plowing and planting operations, reflect the continued importance of seasonal factors in agricultural areas.

Refiners this week were reported in reasonable balance between production and demand for motor fuel, although some operators are pinning their hopes on a modification of the ban against shipment of gasoline from Districts 2 and 3 into the eastern states.

Demand is continuing high for all grades of fuel oil. Last week's provision for special fuel-oil allowances to householders through direct appeal to local ration boards will have a tendency to increase consumption in certain territories.

Calls for kerosene and other light heating oils are continuing at near the midwinter rate because of the hand-to-mouth conditions regulating supplies. This demand is working against broad application of blending inducements extended by OPA in placing all fuel-oil price ceilings on a gravity basis.

Gulf Coast

HOUSTON, Tex.—Kerosene was becoming so tight in the Gulf Coast territory this week that one marketer declared it soon would be a curio in museums. In addition to other conditions which already were creating scarcity of this product, some refiners are reported to be reforming substantial quantities of both kerosene and naphtha into high-octane gasoline. Buyers seeking kerosene for shipment to eastern and northern areas were combing Gulf Coast refineries in vain.

Furnace oil (No. 2) was a close second to kerosene in point of scarcity, and it was prophesied in the trade that there would be a virtual famine in both products if wintry weather persisted long.

Increasing scarcity of 87-octane gasoline was reported, the result, it was said, of widening needs for this grade at military training camps. Supplies of 91-octane material were reported to be fairly well in balance with demand. Rising inventories of the regular-grade gasoline were understood to be causing uneasiness on the part of some of the smaller inland refiners, who have neither facilities for making the higher-octane grades nor storage room for the regular product. Opinion expressed in some sections of the trade was that unless relief is afforded refiners operating under these unfavorable conditions they might have to close their plants. The larger refiners, with flexible operating facilities and adequate storage, do not face any serious problem. Offerings of distillate gasoline from the Grapeland district, received by prospective buyers recently in this territory, have not been repeated.

Pacific Coast

LOS ANGELES, Calif.—There was no appreciable change in marketing conditions in California during the week as a surplus of gasoline has precluded any substantial sales. Another decline is shown in gasoline sales during January as reflected in tax collections. January 1943 sales were 33.84 per cent below sales during the same month last year and it is the general concensus that sales during 1943 will just about approximate the decline shown during January which was the first month to be free of abnormal influences.

Rationing has indicated a number of interesting facts. During January 1943 all major marketers showed declines closely approximating the general curve in total sales and further the number of service stations that have suspended business since the start of the war closely approximates the reduction in total gasoline sales.

Refiners and marketers have finally settled down on the basis of decreased business and even though there is ample crude oil available to greatly step up refining activities, manufacturers are willing to keep runs to stills at modest rates due to distribution problems. It had been thought possible that prices might stiffen with the reduction in the number of marketers in the field but there has been no indication that this trend will materialize in the near future.

Gasoline remains soft to weak but fuel oil and gas oil continue firm and in good demand. Several independent refiners have been able to keep operating through their ability to dispose of gas oil and fuel at steady prices. Straightrun fuel that is not stripped excessively finds a ready market as most of this meets Navy specifications.

A.P.I. REFINERY REPORT

Week Ended February 27, 1943

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	161	3,029	555	729
Ind., Ill., Ky.	718	20,048	2,756	3,676
Okla., Kan., Mo.	344	7,387	1,412	1,543
Censored area*	1,671	40,096	10,061	15,399
Rockies	91	2,052	554	381
California	723	20,545	54,802	11,211
Total 2-27-43	3,709	93,157	70,140	32,939
Total 2-20-43	3,694	92,215	70,428	33,367
Total 2-28-42	3,672	108,156	87,319	34,058

Note: Refinery runs and stocks for week ended March 6, 1943, appear on Trends page, unless unavoidably delayed.

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
February 27, 1943	235,217,000
February 20, 1943	234,562,000
February 28, 1942	259,373,000

*Excludes unrefinable in California.

Refinery Prices

(Prices as of March 9)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*			5.875-6.000		5.500-5.625
Pennsylvania		6.750-7.000			
Gulf Coast‡	6.00-6.50		§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80		9.2	9.2	
California		6.250-6.500	6.125-6.250	5.750-6.000	5.125-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*			4.500	4.375	
North Louisiana				4.500-4.750	
Pennsylvania	6.250-6.625	6.125-6.250			
California				4.500-5.500	4.250
Northeast Coast				6.80	
Gulf Coast				3.875	

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125				‡1.35-1.45	$0.85-0.90
California		2.750-4.000				0.85
Gulf Coast			4.000	4.125	1.45	1.65
Northeast Coast				6.800	2.780	†0.80-0.85
North Louisiana						

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.88	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	
Northeast Coast	6.7	6.7	1.95	1.65
Pacific Coast	5.5	5.5	‡0.80-95	§0.80
Gulf Coast	3.875-4.0		1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)

10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—

Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00
200 vis. at 70° F., 3 color:	
Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.30
Boston, Mass.	14.90	4.50	9.80
Burlington, Vt.	16.90	5.50	10.10
Buffalo, N. Y.	16.20	5.50	10.60
Dover, Del.	16.70	5.50	12.00
Hartford, Conn.	15.60	4.50	9.70
Manchester, N. H.	17.20	5.50	10.80
Newark, N. J.	15.20	4.50	9.70
New York, N. Y.	16.10	5.50	9.80
Philadelphia, Pa.	16.20	5.50	11.65
Pittsburgh, Pa.	16.70	5.50	12.00
Portland, Me.	16.30	5.50	9.90
Providence, R. I.	15.00	4.50	9.60
Washington, D. C.	15.20	4.50	11.00
Average 14 cities	16.02	5.14	10.49

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co., and Texas Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.50
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	6.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.37	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	‡9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.00
Average 11 cities	18.34	7.50	10.46

*Includes 1-cent state tax.
‡Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	14.30
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	16.55	5.96	10.76

Equipment Progress

FORMICA INSULATION CO. AWARDED ARMY-NAVY "E"

The Army-Navy "E" award was presented on February 7 to Formica Insulation Co., Cincinnati, Ohio, for production achievement. Presentation was made by Col. Alonzo M. Drake, Detroit, Mich., Army Air Force central district procurement supervisor. It was the first "E' award by the Army Air Force in that section.

The pennant was received by D. J. O'Conor, president of the company, and three employe representatives chosen by the workers. Comdr. G. H. Bowman, Navy Department inspector, presented the "E" pins to employe representatives.

Russell Wilson, former mayor of Cincinnati, and present councilman, was a civic speaker.

Army Air Force officers conducted a plant inspection of the Formica plant on the morning preceding the formal presentation of the "E" award. Colonel Drake, Maj. Harry W. Smith, Detroit; Maj. Harry T. Shepherd; Maj. Walter A. Ryan, Detroit, and D. J. O'Conor, president of Formica, are seen here displaying the pennant

Manhattan Rubber Enters Golden Anniversary Year

During 1943, with the large plant's manufacturing facilities geared to produce war materials at full capacity, the management and personnel of Manhattan Rubber Manufacturing Division of Raybestos - Manhattan, Inc., Passaic, N. J., will reflect solemnly, but with pride, that the division will celebrate the fiftieth anniversary of its founding as Manhattan Rubber Manufacturing Co.

The original company was incorporated on October 28, 1893, during the panic which lasted from 1893 to 1897. The original plans of its founders called for a location in the neighboring city of Paterson, N. J., as Knickerbocker Rubber Co. These plans were changed when an offer was made by George Engeman, prominent Passaic land owner, to finance the first building if the plant were built on his property in Passaic. This offer was accepted and the company's name changed to Manhattan Rubber Manufacturing Co.

The incorporators were Frank Cazenove Jones, father of Mr. Jones, president of Okonite Co.; W. W. Dashiell, last surviving founder: Arthur Farragut Townsend; Peter Reid, of Reid & Barry; Samuel J. Watson, of Watson Machine Co., Paterson, and George Woffenden. At the first meeting of the incorporators on November 1, 1893, Mr. Watson, Mr. Woffenden, Mr. Dashiell, Mr. Jones and Colonel Townsend were elected to the board of directors. Officers of the company elected at the same meeting were: Mr. Jones, president, and Colonel Townsend, secretary and treasurer. At another meeting within the same year, Colonel Townsend became vice president and assistant general manager; Thomas Robins, Jr., secretary, and the late Commodore Alexander Henderson, U.S.N., retired, treasurer.

Two of Manhattan's early executives and several employes have been with the company for more than 45 years. These officials are F. L. Curtis, now vice president and treasurer of Raybestos-Manhattan, Inc., who was manager of the company's original factory office, and C. T. Young, factory manager, who was assistant to Mr. Curtis in the early factory office. Another early employe is C. E. Cummings, at present assistant secretary.

Manhattan, with a plant in Passaic that now employs nearly 4,000 persons and covers more than a million square feet of floor space, is now entirely engaged in war work. To date 920 of its men have entered service.

Harry E. Smith is general manager and John H. Matthews assistant general manager.

Norton Appoints Two Abrasive Engineers

J. P. Enright has been appointed abrasive engineer for Indianapolis and the vicinity by Norton Co., Worcester, Mass.

Robert W. Crawford has been appointed abrasive engineer in the Pittsburgh territory, taking the place of William A. Russell, who is now an ensign in the U. S. Navy.

Nay Succeeds Frye

Harold S. Nay has been appointed industrial sales manager of Kansas Gas & Electric Co., Wichita, Kans. He succeeds R. E. Frye, who has entered the U. S. Navy.

New Chief Metallurgist For Tube Turns

Tube Turns, of Louisville, Ky., announces the appointment of Fred C. Smith as chief metallurgist. From 1936 to the date of his present affiliation with Tube Turns, Mr. Smith was employed by Carnegie - Illinois Steel Co. at Chicago, in the capacity of field metallurgist. Prior to that he was plant metallurgist for International Harvester Co. at Fort Wayne and Chicago plants.

Mr. Smith is well known in the metallurgical fraternity. In May 1942 he was elected as vice president of the American Society for Metals, which office he resigned when he came to Tube Turns. He is also a member of the American Society of Automotive Engineers and other technical organizations.

His responsibilities at Tube Turns include supervision of all raw and finished materials inspection, forging operations, heat treating, and metallurgical research and service.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED RATE	DISPLAYED—PER INCH
8 CENTS A WORD, minimum charge $2 per insertion.	Classified display advertising set in single or double column style:
SITUATIONS WANTED. 4 cents a word, minimum charge $1.	1 inch .... 1 time $7.00
BOX NUMBERS, count 9 words when replies are to be sent to our Tulsa Office.	1 inch .... 13 times 6.50
10% DISCOUNT if 3 insertions are ordered at one time, with check accompanying order.	1 inch .... 26 times 6.00
All classified advertising payable in advance.	1 inch .... 39 times 5.50
	1 inch .... 52 times 5.00
	Rates are governed by total space used within 12 months from date of first insertion. Credits are allowed when lower rates are earned.

FORMS CLOSE MONDAY NOON—PUBLISHED EACH THURSDAY

LEASES AND DRILLING BLOCKS

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma.
Louisiana and Illinois.
20 Years' Experience
Inquiries Invited
B. D. BUCKLEY
60 Broadview Drive, Clayton
St. Louis, Mo.

NEW MEXICO
State Oil and Gas Leases
Forty acres and multiples thereof, in a new HoT spot. 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington. N. M.

WANTED TO PURCHASE developed producing oil properties in Kansas or West Texas. Prompt action. C. C. Harmon, Nowata, Okla.

The Trustee will sell at public auction at the office of E. M. Baker, Referee in Bankruptcy, 372 Federal Building, Dallas, Texas, at 11:30 A.M., Thursday, March 25th, 1943, the following property in fee less 1/16th mineral rights non-participating. 800 acres located in Wichita County, Texas, three miles south of Iowa Park, in J. McCool Survey of Palo Pinto County School Lands, Blocks One, Two and Ten.

For further details telephone E. M. Baker, Referee, Central 2516. Two hundred acres under lease producing from shallow wells.

E. M. BAKER
Referee in Bankruptcy

LEASES AND DRILLING BLOCKS

OIL MEN—Why don't you try semi-proven Junet Structure in Grant County, Ark.? We give you 2500 to 3000 acre block. Vinc. Herodes, 1534 So. Pulaski Rd., Chicago, Ill.

GOVERNMENT leasing OIL Reservation Lands to American citizens, limited filing each. Want several help file structure, developing area. Its opportunity, small expense. Box B-522, The Oil and Gas Journal, Tulsa, Okla.

STRUCTURE fully geologized, geophysical, cored, equipped rotary and cable. Contractor drafted. Want deal completion. S. W. Pressey, Pueblo, Colo.

FINANCING

CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

ROYALTIES

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., National Mutual Bldg., Tulsa, Okla.

HELP WANTED

CHEMIST WANTED for 5,000 barrel refinery, Central, Kansas. Permanent position with fine opportunity for advancement. In reply state age, experience, education and draft status. Box B-521, The Oil and Gas Journal, Tulsa, Okla.

PROCESS ENGINEERS
Graduate Chemical Engineers and Chemists. Prefer men with experience in refinery or gasoline plant on design or operation of light end equipment. Location, Mid-West. Permanent position. In reply state experience, education, age, draft status and salary expected. Box B-510, The Oil and Gas Journal, Tulsa, Okla.

NOTICE TO ADVERTISERS
Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

HELP WANTED

WANTED: Draftsman for general refining drafting. Permanent position. Reply must state experience, education, age, draft status, expected salary, and references. Box B-511, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Man with geological and land experience especially in Illinois, Indiana, and Kentucky. Give experience, present connection, and salary desired. Box B-512, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Experienced Industrial Engine Parts man. Must be capable of managing parts department. Good wages. Give draft status. Apply P.O. Box 1159, Tulsa, Okla.

SITUATIONS WANTED

OIL ACCOUNTANT, office manager, 20 years experience, age 44, draft deferred. Box B-500, The Oil and Gas Journal, Tulsa, Okla.

CHEMIST with 13 years technical, manufacturing, and supervisory experience in production and refining. Only positions of responsibility considered. Box B-502, The Oil and Gas Journal, Tulsa, Okla.

EXECUTIVE ENGINEER, age 38, 20 years active experience sound organizations, refining and heavy chemical field. Well versed equipment, processes, engineering, estimating and construction. Desires contact management where this experience can be used. Box B-513, The Oil and Gas Journal, Tulsa, Okla.

REFINERY Manager-Superintendent with 10 years experience all phases refining plus 10 years experience in all phases of management. Would be interested in managing small refinery on profit-sharing basis. Box B-514, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST - GEOPHYSICIST — Experienced in surface and subsurface geology; seismic and gravity interpretation; scouting and some land work. Major part of experience in Mid-Continent and Texas-Louisiana Gulf Coast. Now employed in Mid-Continent area. Age 40, Married, one child. Box B-517, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL ACCOUNTANT, soon available, desires permanent connection with independent operator. Actually experienced in accounting, office management, taxation, government regulations, etc., for production and drilling operations, corporation and individual. Box B-516, The Oil and Gas Journal, Tulsa, Okla.

BY production engineer experienced in gasoline plants, drilling, production, appraisals in Southwest with several years foreign service. Above draft age. Box B-520, The Oil and Gas Journal, Tulsa, Okla.

WYOMING OPERATOR 25 years experience developing, producing, marketing. Complete office, records, geology, etc. Will represent nonresident owners. No promotions. Box 1004, Casper, Wyoming.

LEGAL BLANKS

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 218 East Third St., Tulsa, Okla.

PATENT ATTORNEYS

PATENTS, Trade-Marks. Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1918. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

REAL ESTATE

WINNFIELD, LA.
Center of North Central Louisiana oil activity, invites oil men and oil concerns to make their homes and headquarters at Winnfield.
TOWN OF WINNFIELD
City Hall Winnfield, La.

(Continued on Next Page)

CLASSIFIED ADVERTISING — EQUIPMENT FOR SALE

3 COMPLETE CRACKING UNITS

5,000 barrel topping, 2,200 barrel cracking, 1,000 barrel gasoline recovery plant, car load Ethyl plant, approximately 50 storage tanks from 200 to 55,000 barrels included—
Located—KILGORE, TEXAS

2,000 barrel Vis-Breaker, 500 barrel asphalt plant—
STARK, MICHIGAN

1,200 barrel cracking unit—Complete, located—ST. PAUL, MINN.

All towers, pumps, valves, fittings, instruments, boilers, and other miscellaneous equipment to be sold separately.

SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry
Union Ave. at 21st Street

Robt. W. Duden
Tulsa, Oklahoma

FOR SALE—One partial list steam rotary equipment located near Coyle, Oklahoma, priced right to sell. Inquire T. T. Eason and Company, Enid, Okla.

COMPRESSORS—TANKS—FOR SALE
2—Bessemer type 8, direct driven engine and compressors, 80 hp., 180 r.p.m. Engine cylinder 16 x 20 and air cylinder 7 x 20. **2**—Bessemer compressors same as above with air cylinder 14 x 20. 3—8,000 gallon capacity steel gasoline storage tanks, size 10'x13'x¼", riveted. Louisiana Iron & Supply Co., Longview, Texas.

FOR SALE: 30,000 barrel oil storage tank, condition perfect. F. H. Gregory, Pharr, Tex.

4—Lucey boilers & headers, Ideco drawworks, Ideal & Oil Well twin cylinder drilling engines, 18" Wilson-Snyder, & 14" Ideal pumps, 6" Gray Swivel, Boykin rotary, drill cables, boiler feed pumps, Ideco crown block, engine substructure, engine skids, 122' steel derrick & substructure, traveling block & hooks, Moon generator, 9000' 4½" & 3½" drill pipe, 1000' of 4" Victaulic pipe, blowout preventers, Brewster core reel & lime, Xmas tree, 1000 bbls. Parkersburg tanks, and other equipment. First class condition. Prices right. For particulars communicate Sorrento Petroleum Corp., American Bank Bldg., New Orleans, La.

USED cranes, shovels, draglines, clamshells, graders, pumps, compressors, generators, gasoline and electric motors and other contractors equipment. L. A. ROUNTREE, 362 Pierce, Gary, Indiana.

1—100 H.P. 2 cylinder McEwen Oil Engine in excellent condition, horizontal stroke, speed 250 rpm. Write or wire Haxton Canning Company, Oakfield, New York.

STEEL BUILDING, 108' x 630' with crane. Several additional buildings from 44' x 64' up to 53' x 122'. INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., Ra 0889-Ma 5586, Canal Building, New Orleans, La.

Second hand Oklahoma City alloyed sucker rods, ¾", ⅞" and 1".
Sucker Rods, Fishing Tools, Tubing Spiders, Tubing Catchers, all sizes.
Structural Steel and Reinforcing Rods.

M. R. TRAVIS
1702 S. Boulder Tulsa, Oklahoma.

DIESEL—GAS—ENGINES
Large selection—All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.
Complete information on request.
A. G. SCHOONMAKER COMPANY
48 Church Street, New York, N. Y.

FOR SALE: At Oklahoma City 4 Parkersburg #4901-C, 424,000# capacity, 123' Rotary Derricks. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE: Complete steam rotary drilling rig with 126 foot steel derrick and equipment located in Wyoming-Montana Field. Box B-505, The Oil and Gas Journal, Tulsa, Okla.

6—RECONDITIONED automatic stop and check valves, three inch, Series thirty, flanged. Industrial Supply & Equipment Co., Inc., 338 Baronne St., New Orleans, La.

FOR SALE: At Hobbs, New Mexico—2—65 HP, 1—85 HP. LFB Boilers. Cities Service Oil, Patridge, Bartlesville, Okla.

2—120 HP, 650 RPM, rebuilt Diesel engines, power units.
1—200 HP, 514 RPM, completely rebuilt Diesel engine, power unit.
The two above can be supplied with Generators if desired.
2—66 HP Boilers.
1—75 HP variable speed A.C. Motor.
4—45 HP 950 RPM, new Atlas Imperial gas engines.
Also variable sizes small alternating current motors.

K. S. RICHARDS
P.O. Box 443 Fort Worth, Texas
Phone 3-5600

1—2 Reel Unit and Two-in-one Indicator and Measure Meter (Frank Mathey Machine Works Unit) Magazine and Body. Extra Magazine. 50—Copper Cans. 50—White Glycerin Can Covers. Approximately twenty shots have been run on this outfit. Ansberry-Torpedo Co., Senecaville, Ohio.

7000 FEET 6⅝" O.D. Pittsburgh Special drill pipe, each joint equipped with Protin type tool joints. Excellent condition and only slightly used. Priced to sell.
6500 FEET 3½" O.D. Upset tubing—good condition (only used to gas lift oil) 35c per foot.
Four Oil Well 125 H.P. 350# W.P. boilers. Excellent condition. $2500 each.

HALL & BRISCOE, INC.
Oklahoma City, Oklahoma. Phone 7-4531

ONE COMPLETE steam rotary drilling rig with 4 Oil Well 125 HP 350# W.P. boilers —6500' 4½" O.D. drill pipe with tool joints. Rig ready to go and in good condition. Price $30,000. Hall & Briscoe, Inc., Oklahoma City, Oklahoma, Phone 7-4531.

FIRE TUBE BOILERS
(New or Used)
ONE WEEK'S DELIVERY AFTER RECEIPT OF ORDER

MOORE & COMPANY
1701 Nat'l Bank of Tulsa Bldg.
Tulsa, Oklahoma
Telephone 2-0058

5—7½"x20" Type VS, 500-lb. W. P. Clark Compressor Cylinders complete with clearance pockets. Call or write Cimarron Gasoline Corp., Box 246, Coyle, Okla.

2— 565 HP at 1200 RPM 8 Cyl. Sterling Comb. Gas Engines, Direct connected to 300 KW 480 Volt 60 Cycle General 3 Phase Electric Generators Alternating Current Complete.
2—165 HP at 1800 RPM 6 Cyl. Sterling Comb. Gas Engines Direct connected to 100 KW 400 Volt 3 Phase 60 Cycle A.C. General Electric Generators Complete.
4—200 HP 480 Volt 3 Phase 60 Cycle G.E. Motors, A.C.
3—150 HP 480 Volt 3 Phase 60 Cycle G.E. Motors, A.C.
1—75 HP 480 Volt 3 Phase 60 Cycle G.E. Motors, A.C.

MAJOR TOOL & SUPPLY CO.
Oklahoma City, Okla.

FOR SALE—Bessemer Gas Engines, Compressors and repair parts. Vessels, towers, pumps, Chaplin Fulton regulators, Fisher liquid level controls, vacuum, pressure & temperature recorders, meters, valves, fittings, pipe and other miscellaneous material. GILBERT PIPE & SUPPLY, Electra, Texas.

STANDARD CABLE OUTFIT, all steel, complete tools, bits 20" to 6" with stems, jars, sockets, bailers, etc., lighting plant, boilers, engines. Sell complete or separate items. S. W. Pressey, Pueblo, Colorado.

FOR SALE: Russell, Kansas, 1-122' American Steel Angle Iron Derrick knock-down, capacity 246,000#. Cities Service Oil Company, Patridge, Bartlesville, Okla.

1—11' Stroke Type J 51 Parkersburg Pumping Unit less Engine. 1—Type R Double Drum Cardwell Unit with Rotary and Spudder attachment with HXD Hercules Diesel Engine. 3—27½" Emsco and Union Tool Oil Bath Tables. 1—7¼ x 12 Cardner Denver Power Pump with Skids. Major Tool & Supply Co., Oklahoma City, Okla.

1-#2 NATIONAL DRILLING Machine, wooden mast. Call or write E. M. Howard, Rising Star, Texas.

FOR SALE: Lufkin pumping unit suitable for 4000' well. Melton Supply Co., Seminole, Okla.

COMPLETE, semiportable, rotary rig priced 60 per cent new cost, A-1 shape. Wilson Mogul draw works PA-100 IH engine, GD 7¼ x 10" pump 150 HP Climax engine, 94' derrick, Ideco rotary, 2000' 4½" drill pipe, tool house, subs, drill collars. P. O. Box 366, Ridgewood, New Jersey.

1—4" Shell 4' x 40' Forged Steel Reaction Chamber
1—½" Shell 5' x 74'—4000 barrel cap.—Crude Oil Fractionator with Trays.
120—Pieces 3" I. D.—3½" O. D.—30' long—Chrome Tubes.
30—Pieces 3½" I. D.—4" O. D.—21' to 28' long—Chrome Tubes.
162—3½" O. D.—6½" Centers—Chrome Key Headers.
30—Pumps, various sizes and types.

A. C. BARTSCH
BOX 127, FOREST PARK, ILLINOIS

HORIZONTAL STEEL TANKS

6—10 Ft. dia. by 30 Ft. Long.
2—10 Ft. dia. by 29 Ft. 6 In. Long.
2—9 Ft. dia. by 30 Ft. Long.
10 Above Tanks in Western Kansas.
3—4,000 Gal., 2—6,500 Gal.
2—10,000 Gal. in Ohio and Pennsylvania.

VERTICAL TANKS

29,000 Bbl. 90'6" x 25'6"
19,600 Bbl. 75' x 25'5"
2—7,500 Bbl. 44' x 28'
5,500 Bbl. 37'6" x 27'6"

R. C. STANHOPE, INC.

60 East 42nd St. New York, N. Y.

Classified Advertising

EQUIPMENT FOR SALE

1—Used 7x8 Worthington Vertical Triplex power pump, cheap. INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., 338 Baronne St., New Orleans, La.

FOR SALE—Approx. 6500 ft. 6⅝" OD 25.20# drill pipe with Reed Full Hole Shrink Grip Tool Joints, A-1 condition. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE

25—50 HP O.C.S. Bat Pumping Units with 50-65 HP 13" x 18" Continental Fairbanks-Morse Oil Engines with #8000 Sturdivant Coolers.
16—150 HP Model 47 Horizontal 2 Cylinder 14 x 18 Fairbanks-Morse Semi-Diesel Engines.
11—40 HP at 400 RPM Clark Bobcat Gas Engines.
4—30 HP at 300 RPM Clark Bobkitten Gas Engines.
2—180 HP Model 35E 8¾ x10½ 6 Cylinder Fairbanks-Morse Diesel Engines.
2—240 HP Model 35E 10 x 12½ 6 Cylinder Fairbanks-Morse Diesel Engines.

H. A. McCARTHY
Tulsa, Okla.
2538 S. Norfolk Phone 4-5791

FOR IMMEDIATE SHIPMENT FROM STOCK

125—20" Dresser Couplings complete with with Rubber Rings and Bolts, perfect condition.

50—30" Dresser Couplings complete with Rubber Rings and Bolts, perfect condition.

BROWN-STRAUSS CORPORATION
Box 78
Kansas City, Missouri

EQUIPMENT FOR SALE

AIR COMPRESSORS, Graders, Road Rollers, Pneumatic Air Tools, other contractors Equipment and Refinery Equipment. Rent or sell. Falls City Sales Company, Box 776, Louisville, Kentucky.

FOR SALE—One complete steam rotary outfit less boilers, located near Coyle, Oklahoma, priced to sell. Inquire T. T. Eason and Company, Enid, Okla.

EQUIPMENT WANTED

WANTED: Well servicing units in good condition. All makes and sizes considered. We pay cash. Melton Supply Co., Seminole, Okla.

WANTED: Duplex Steam Pumps any size and Deep Well Pumps. What do you have to offer? INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., Canal Building, New Orleans, La.

WANTED: Truck load quantities, or more, of used small pipe, black and galvanized, ½", ¾", 1", 1¼" and 1½", shopped or unshopped. Advise price and location. CENTRAL PIPE & SUPPLY CO., 2611 Avenue H, Lubbock, Texas.

WANTED
Abandoned Pipe Lines, in or out of the ground, Oil Wells, Steel Buildings and Steel Storage Tanks of all sizes.
JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards, St. Clair Co., Illinois.

RANCHES AND FARM LANDS

2000 ACRES IMPROVED livestock farm, Choctaw County, Oklahoma. On Federal Highway. Abundant water, pasture, meadow, timber, and arable land. Excellent building sites. J. J. Thomas, Seward, Nebraska.

INCORPORATION

DELAWARE CHARTERS: Powers broad, taxes low. Many of the largest corporations have Delaware charters. Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

Canadian Fields

(Continued from Page 98)

ment regulations covering the outlying sections of the Fort Norman field is preparatory to further development already definitely planned, largely by Imperial Oil which has secured leases covering the most promising locations. The field was first drilled in 1919, but after completion of a few producers it stood idle till about 1933, when the company arected a small refinery to supply fuel oil for Great Bear Lake mining operations. In 1939 this refinery was modernized and equipped to produce aviation gasoline, its capacity being stepped up from 300 to 800 bbl. daily. As a result of new drilling operations undertaken last spring, and still continuing, the output of the field in 1942 was increased to 37,521 bbl. but the potential output was much larger, production operations being restricted for lack of marketing and transport facilities. These are to be provided by construction of a road to Fort Norman from Notikewin on the Peace River, and the laying of a small-diameter pipe line from the field to White Horse, where a refinery will be erected. The new regulations contemplate extension of drilling operations through a radius of 50 miles from the original discovery.

Crude-Oil Prices

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

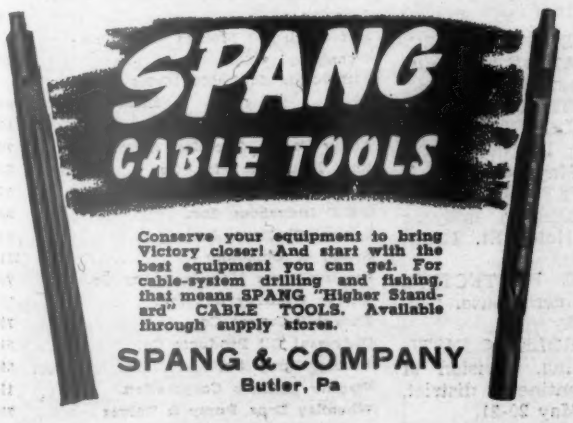
*No change since 5-21-41.

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80	...	...	...
19-19.9	.84	...	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	...	1.07	1.30	.94
32-32.9	...	1.09	1.32	.96
33-33.9	...	1.11	1.34	.98
34-34.9	...	1.13	1.36	1.00
35-35.9	...	1.15	1.38	1.02
36-36.9	...	1.17	1.40	1.04
37-37.9	...	1.19	1.42	1.06
38-38.9	...	1.21	1.44	1.08
30-39.9	...	1.23	1.46	1.10
40 and above	...	1.25	1.48	1.12

*Includes Lea County, New Mexico.



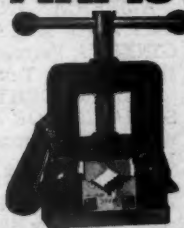
Conserve your equipment to bring Victory closer! And start with the best equipment you can get. For cable-system drilling and fishing, that means SPANG "Higher Standard" CABLE TOOLS. Available through supply stores.

SPANG & COMPANY
Butler, Pa

Look for the Arm-and-Hammer

ARMSTRONG BROS.

IMPROVED PIPE VISES



Frames are of Certified Malleable Iron, cadmium finished. Replaceable jaws are of tool steel, accurately milled and hardened. Nos. 70 and 71 have 1-piece jaws with solid center that prevents kinking of small and thin walled pipe, conduit and tubing. Oval end handles will not pinch hands. Hinged vises have unbreakable drop forged hook. Chain attachment for Open Side Vises permits mounting to any pillar or post.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
304 N. Francisco Ave., Chicago, U.S.A.
Eastern Warehouse and Sales:
199 Lafayette St., New York, N. Y.

Write for Catalog C-39

Journalisms:

METAL-COATING of worn parts, or metallizing, has received wide application in many industries and today, when purely economic considerations have given way to wartime necessity, the process presents possibilities far beyond those of normal times. It is particularly adaptable to the rebuilding of pump shafts, valve stems and bearing surfaces. Charles K. Stipp, of Metallizing Engineering Co., Inc. has a paper describing the process in next week's Engineering and Operating Section.

DRILLING oil wells by the slim-hole method has been widely used in California and the practice is spreading into other areas. A staff article in next week's issue shows how it is being applied in the Barnhart field in West Texas and relates how drilling difficulties are being met.

AT THIS time when water flooding in eastern Kansas has assumed a position of sufficient importance to require that it be taken into consideration in predictions of future production, a number of questions are being raised regarding the relation of such operations to stripper production. A discussion of the subject will appear in next week's issue with attention given to technical developments affecting the application of production methods now available for that area.

WATER production is becoming a major problem in many fields of western Kansas. With the increasing volumes of water which must be handled the full import of the problem is just now being felt and is giving increasing concern to the operators. Not only must the water be disposed of but its highly corrosive characteristics have made maintenance of equipment difficult. The water situation has been accentuated lately by increased allowables which have resulted in higher rates of fluid withdrawal. What the operators are doing to control the water production and combat equipment corrosion will be discussed in two articles in early issues of The Journal by a staff writer who has just returned from an extended trip through Kansas fields.

CALENDAR

March

NORTH TEXAS OIL AND GAS ASSOCIATION, annual meeting, Wichita Falls, Tex., March 13.

OKLAHOMA UTILITIES ASSOCIATION, conference for executives and department heads, Tulsa Hotel, Tulsa, March 22.

AMERICAN PETROLEUM INSTITUTE, spring meeting, Division of Production, Pacific Coast District, Biltmore Bowl, Los Angeles, Calif., March 23.

April

INTERSTATE OIL COMPACT COMMISSION, quarterly meeting, Wichita, Kans., April 2-3.

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, annual meeting, Texas Hotel, Fort Worth, Tex., April 7-9.

AMERICAN PETROLEUM INSTITUTE, Division of Production, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 8-9, 1943.

AMERICAN CHEMICAL SOCIETY 105th annual meeting, Detroit, Mich., April 12-16.

NATURAL GASOLINE ASSOCIATION OF AMERICA, twenty-second annual meeting, Baker Hotel, Dallas, Tex., April 14-16.

NATURAL GAS MANAGEMENT CONFERENCE, under auspices of Natural Gas Section, American Gas Association, Gibson Hotel, Cincinnati, Ohio, April 28.

AMERICAN PETROLEUM INSTITUTE, DIVISION OF PRODUCTION, Southwestern District, Rice Hotel, Houston, Tex., April 29-30.

May

PETROLEUM INDUSTRY ELECTRICAL ASSOCIATION, annual meeting, Houston, Tex., May 5-6, 1943.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, Baker Hotel, Dallas, Tex., May 6-8.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, midyear meeting, Jefferson Hotel, St. Louis, Mo., May 7-8.

NATIONAL FIRE PROTECTIVE ASSOCIATION, Palmer House, Chicago, Ill., May 10-15.

AMERICAN PETROLEUM INSTITUTE, spring meeting, Division of Production, Mid-Continent district, Mayo Hotel, Tulsa, May 20-21.

ADVERTISERS

Acme Fishing Tool Co. 96
Air Reduction Sales Co. 1
Allen Corp., The 75
American Cable Division of American Chain & Cable Co., Inc Inside Back Cover
American Cast Iron Pipe Company 94
American Roller Bearing Co. 64
Armstrong Bros. Tool Co. 111
Baker Oil Tools, Inc. 20
Brewster Company, The 103
Broderick & Bascom Rope Co. Front Cover
Brown-Strauss Corp. 75
Buda Co., The 93
Cable, Jo H. 96
Cast Iron Pipe Research Association, The 55
Chicago Bridge & Iron Company 4
Classified Advertising 109-110-111
Climax Engineering Co. 80
Cooper-Bessemer Corp., The 52-53
Crutcher-Rolfs-Cummings 78
Darling Valve & Mfg Co. 2
Dravo Corporation 76
Elastic Stop Nut Corp. 3
Fisher Governor Company 17
Fluor Corporation, Ltd., The 6-7
General Electric Company 8
General Geophysical Co. 77
Grancell, I. H. 103
Gulf Oil Corp. 10
Hughes Tool Co. ..... Back Cover
International Nickel Company, Inc., The 18
Kellogg, M. W., Company, The 12
Keuffel & Esser Co. 94
Kidde & Co., Inc., Walter 9
Lamtex Equipment Corp. 103
Larkin Packer Company, Inc. 49
Leschen, A., & Sons, Rope Co. 61
Link-Belt Company 5
Lone Star Cement Corporation 16
Lucey Export Corporation 83
McCord Radiator & Mfg. Co. 76
Martin-Decker Corp. 68
Mission Mfg. Co., The 70
National Bank of Tulsa 92
National Supply Co., The 88-89
National Tube Co. 14-15
Page Fence Association 65
Parkersburg Rig & Reel Co. 63
Patterson-Ballagh Corporation 101
Penberthy Injector Co. 47
Pennsylvania Grade Crude Oil Association 13
Pittsburgh-Des Moines Steel Company 97
Pittsburgh Equitable Meter Co. ..... Inside Front Cover
Reed Roller Bit Company 56
Reilly Tar & Chemical Corp. 78
Ross Heater & Mfg. Co. 62
Ryerson & Son., Inc., Joseph T. 96
S K F Industries, Inc. 68
Spang, Chalfant, Inc. 85
Spang & Company 111
Stearns-Roger Manufacturing Co. 73
Taylor Foundry Co., Inc. 93
Thornhill-Craver Co. 79
Universal Oil Products Co. 51
Viking Pump Co. 65
Wagner Electric Corporation 11
Wheatley Bros. Pump & Valves 79